POWERS OF THE SHIPPING CONTROLLER. See p. 484.
AN IMPROVED METHOD OF SHIPBUILDING (Illus.) See p. 488.

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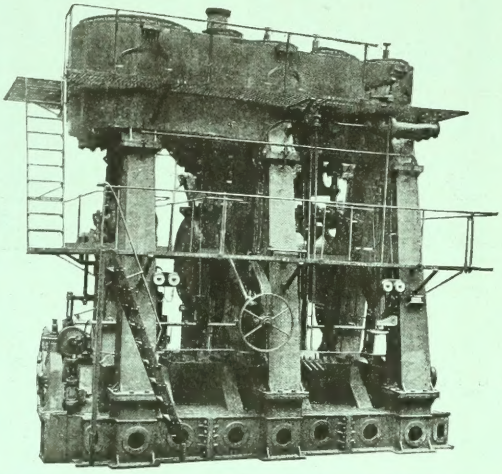

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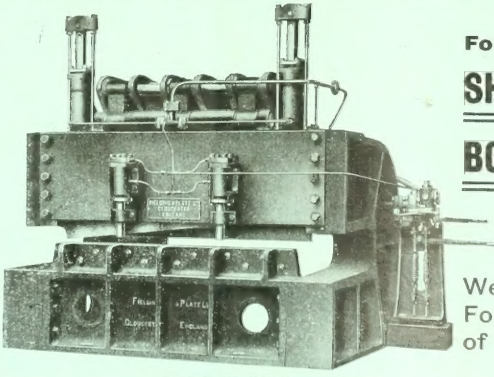

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The State and Labour.

THERE is a good deal to be said for the view that no other Department of the State or sub-department or individual politician ought to be free to interfere with the legitimate functions of the Chief Industrial Commissioner's branch of the Ministry of Labour. As matters stand, half-a-dozen "authorities," including the Ministry of Munitions and the Admiralty Shipyard Labour Department, seem to have large "powers" to adjust labour differences which on their face ought really to be adjudicated upon by the Committee on Production. The result is, if not exactly chaos, a state of matters which is not at all conducive to efficiency in the production of material for the naval and military forces. We are strongly in favour of placing the full responsibility for the adjustment of differences on the shoulders of the Ministry of Labour, and also, if necessary of further enlarging the Committee on Production. We demur, however, from the suggestion that to do so would be to cure all the present troubles. Admittedly, the Committee on Production has, to date, done its work with comparatively little dissatisfaction to the parties concerned. But it would not serve a useful purpose—probably the reverse—to ignore the fact that there have been strikes against awards—in other, blunter words, appeals from the Committee on Production's decisions to "powers" which are political and not judicial. The cure for the trouble obviously is for the Government to allow no appeal from decisions of the Committee—not even to the Minister of Labour—and to insist on the loyal obedience of the workers to its findings. Such a step would necessarily involve important changes in the Ministry of Munitions and the Shipyard Labour Department, including the disbandment of a number of central and local "advisory" committees which, on their records, have not been conspicuously useful.

Navigating Without Lights.

Considerations of prudence alone impose on ships the advisability of navigating without lights in the war zones. British ships of course comply with Admiralty regulations on the subject, but it was interesting to have Mr. Justice Hill in the case of the *Algol* discussing the position of foreign ships which steaming in the darkness in a war zone collided. The *Algol* was a Russian ship, and the other vessel, the *Embla*, was Norwegian. Their lights although not shown were ready to be exhibited. The *Embla* sank in the collision. The regulations for preventing collisions at sea which have been adopted, both in regard to Russia and Norway, are in the first place insistent that the rules concerning the showing of lights shall be complied with from sunset to sunrise. Article 27 qualifies this by laying down that in obeying these regulations due regard shall be had to any special circumstances which may render a departure from them necessary in order to avoid immediate danger. If either vessel had shown lights it would have been a beacon for the German U-boats. Mr. Justice Hill, acting in consultation with the Elder Brethren, said that the non-exhibition of lights on both was a course which a prudent seaman would have followed. Negligence in this matter could be ascribed to neither vessel.

Fighting the Submarine.

Sir Eric Geddes thinks that it is too soon yet to feel confident that the submarine campaign has been finally defeated. He warns the public against any relaxation in the measures of economy which a shortage of shipping imposes. That is the right attitude to adopt. There were optimistic passages in his speech early this month on the mastering of the menace, but they have been interpreted in such an unduly rosy light that he prudently cautions the public against too confident anticipations. There are two events, however, which are undoubtedly encouraging. The shipping losses for last week from submarine or mine included only one vessel over 1,600 tons. On Monday, moreover, the Prime Minister told the House of Commons that on Saturday alone we destroyed five enemy submarines. He says that he has no further fears as to the submarine. Sir Eric Geddes, only a few days earlier, was treating the situation in a spirit of Scottish caution. And it is the best policy, while hoping for the best, to prepare for the worst. It is well to remember that the submarine campaign has been subject to recurrent gusts of intensity.

Return Premiums for White Sea Voyages.

The suspension of marine insurance policies, through the risk being assumed by the Government on voyages made to the White Sea, has brought about a state of affairs which was not foreseen when the idea was first mooted, though the matter was fairly obvious on mature consideration. We refer to the reduction of premium which affects the account of the marine underwriter on policies suspended for these voyages. To take a concrete example, a steamer insured at a rate of 70s. per cent. was on one of these voyages for a period of 114 days, the return of premium for the suspension working out at 20s. 9d. per cent. to the marine underwriter. This leaves him with a premium of £1 19s. 1d. per cent., absolutely net, for the balance of the twelve months' policy. This is strictly *pro rata* and therefore a suffi-

cient premium for the time at risk, the vessel in this case having been safe at the expiry of the policies. Let us take the case of the same vessel had she been lost, however, and it will appear that the marine underwriters are under a disability with regard to the returned premium, for unlike most returns, that for the suspension of policies on the voyages in question is collectable whether the vessel be lost or not. The underwriter then will pay a loss of 100 per cent., receiving in premium £1 19s. 1d. per cent., though had the insurance been placed for a short period, equal in duration to the unsuspended time, a full twelve months' premium would have been payable in the event of loss, and the underwriter would have been better off by the amount represented by 20s. 9d. per cent. on his line, that being the balance of premium necessary to bring the amount paid for the short period policy up to the amount payable for the full twelve months. It is hardly necessary to add that practically all short period policies are placed with the "Twelve months' premium in the event of loss" clause.

Collision Claims.

It is evident, from the amount of law cases which are at present being decided, that underwriters will have a heavy batch of claims for collision to settle in the near future. The cause of many of these accidents, which are only too frequent in these days, is, in many instances, due to the radical changes in the methods of navigation which have become an enforced necessity of late. Amongst other reasons, the steaming at night with lights out has resulted in collisions which would otherwise have been avoidable, and more than one case has recently been fought in the courts on this very point. A previous decision on a similar question had led to the belief that, where the obscuring of lights was a matter of military necessity, a decision, by which the settlement of the claim would rest on the war risk policy, might be expected in such cases, but recent developments have gone a long way to dispel this idea, and it would seem that a very particular instance of warlike operations must be proved before the cause of the collision can be shown to be a risk excluded by the "Free of capture and seizure clause," and the claim be attached to the war risk underwriters. To underwriters who rely mainly on their marine risk premiums, this state of affairs must be a cause of anxiety. It is the addition of a further hazard to others which they are bearing as a result of the war, hazards which were never contemplated when the framing of marine insurance contracts were first considered. It is true that the arbitration scheme is about to lighten their burden in this respect as soon as it comes into action, and it now remains for the same acute brains which formulated this scheme to find an equitable way of meeting the claims for Lights Out Collisions.

British Shipping's Position.

The British shipowner's critics are, of course, entitled to make as much as they can of his war period dividends, although it would be fairer of them to admit that there are often facts of the matter which might be taken into account. But they are not entitled to frame their arguments in such a fashion as seriously to misrepresent the main contention of British shipowners. British shipowners are most concerned about the future in which they will have to contend with foreign shipowners, whose profits are not being taken to the extent theirs are and who will be able, as the recent Norwegian provisional contracts indicate, to order ships at once and pay almost any price for them. The British Government is not only taking the money with which British shipowners would be able similarly to secure themselves; it is denying them the liberty to build ships with money drawn from other sources, and itself building, at lower than market prices, ships which it hopes to sell at full market prices when the war comes to an end. That is the position in a nutshell, and the public must sooner or later come to realise the truth. The prospects of British shipping are in reality most disquieting, and no amount of arguing by politicians and others who see only the surface of things, can alter the fact that they are. Several foreign shipping industries are already, thanks to the British Government's short-sighted action, economically in a much better position than our own for after-the-war operations, and every day that passes without a drastic change of British policy is bound to see their advantages increased. British shipowners are not asking for privileges; but they do not think they ought to be denied reasonable fairplay.

Utilisation of Canals.

In a recent article we drew attention to the various uses to which canals could be put, these being, broadly speaking, three, viz., strategic, for the passage of ships and for the passage of barges; and whilst each of these is of extreme importance, it must not be forgotten that the development of any one of these types of canal tends to develop the district through which it passes. We draw attention to an article by Mr. W. Veysey Lang, which will be found on another page, in which he suggests the possibility of building shipyards on canal banks, the launching to be performed by the simple operation of floating the hull, which would be laid down in specially constructed shallow draught dry docks. Other uses to which the banks of the canal could be put will suggest themselves. Thus the canal could be constructed with the definite idea of developing the industry of a particular district by the establishment of wharves to which the raw materials required by the industry could be brought and from which the manufactured product could be shipped. Again, a large scheme of storage of such materials as grain or rubber could be carried out, the warehouses and quays to be constructed as part of the canal scheme. It is only necessary that these subsidiary projects should be considered when the canal itself is being projected and not left to spring up by chance after the canal is finished.

Big Franco-Swiss Canal Scheme.

Hitherto, all the plans for giving Switzerland direct access to the sea have been German, the utilisation of the Rhine being, of course, an integral part of the various schemes put forward in this connection. Now, however, it is announced that American financiers have opened negotiations with a French syndicate for the canalization of the Rhone from Geneva to Marseilles. A large portion of the necessary capital has already been subscribed, and engineers are at work on the details. By linking up the Rhine, if this should afterwards be considered desirable, there would be a waterway running right through the heart of Europe, by way of France, Switzerland, Germany, and Holland, and connecting the North Sea with the Mediterranean. As a matter of fact, a Swiss Association, which has been in existence for several years, is pledged to prolong the "river route" from Geneva to Basle, via the lakes of Neuchatel, Morat, and Bienne, and the River Aar, which flows into the Rhine; but to what extent present international complications are likely to affect the North Sea-Mediterranean project is impossible at present to determine. As regards the Rhone undertaking, however, it is certain that its completion would result in a big development of traffic between France and Switzerland, as well as in an expansion of the latter country's facilities in relation to overseas trade. It is understood that Swiss commercial interests intend to acquire a number of steamers and barges, the former to run to and from the Americas after the war, and the latter to continue the service between Geneva and Marseilles.

The National Yards.

Parliament's interest in the question of national shipyards has not been to date very helpful to the public, partly because the questions put by Members have not been very searching, but largely because the answers given to them have been, if anything, a little more vague than official answers usually are. One or two facts have, however, been made clear. There are to be no more than four establishments of the kind; three of them are to be on the Bristol

Channel; and labour for them is not to be withdrawn from the private yards, although the services of some foremen may; and no vessels are to be laid down in them until there is a margin of labour and material over the full requirements of existing yards. These are assured, rightly or wrongly, by the man in the street, to be concessions to the merchant shipbuilding industry, which for various reasons strongly opposed the scheme. One important point is, however, still obscure, and until it is cleared up it can hardly be said that the objections of shipbuilders have been met. How long are these State yards to continue in operation? On one day Mr. Macnamara said they were to be continued as National yards under the direction of the State after the end of the war, and the following day that they were to continue in operation only until the National need for ships was satisfied. On its face, neither of these statements is very satisfactory, for National yards will necessarily compete for work on a very different economic basis from private yards. It is difficult, of course, for the State to be definite about future arrangements, but the Admiralty might, nevertheless, be profitably asked to indicate which kinds of vessels it intends to lay down in the new yards when the demand for merchant ships slackens.

Lay-out of Shipyards.

When shipbuilders contemplate the commencement of a new shipyard they form an idea of the size of the ships likely to be constructed therein, and this forms the basis of their plans. If for purely merchant ship work the berths would be assigned a given length and width, and the positions of the shops and erecting appliances would be determined to suit. Their plant for the punching and shearing of plates and bending of frames would be arranged on the principle that the nearer these are to the erecting berths the less the waste of labour. It is, therefore, a tolerably easy matter to make a yard suitable for these contemplated conditions, but the trouble begins when the sizes of ships originally considered are exceeded and the shipbuilder desires to begin their construction. The topography of some of the older and larger yards is constantly being altered. A few years ago a vessel of 600 ft. in length was considered very large, and such could be built in the existing berths. With the increase up to almost 1,000 ft. which has since taken place, it was found that the removal of buildings, the extension of fitting-out basins, alterations in the methods of handling and erecting had all to be effected, and that at an expenditure which might have been to a large measure saved could the trend of development been foreseen. At the present time it appears that the greatest demand will be for ships of about 5,000 to 7,000 tons deadweight capacity, and if new yards are being arranged for the construction of ships of these sizes there seems to be every prospect of many years' work ahead for them. If the building of large liners is contemplated it is possible that even the 1,000 ft. berth will be unequal to the demands of the not far distant future.

Steel and Shipbuilding.

Given an adequate supply of steel, it would be an easy matter for shipyards to turn out ships at a far more rapid rate than has hitherto been possible, and one of the first steps to be taken by the Government in its scheme of standardised construction was to ensure the production of plates and sections required in cargo-ship construction at such a rate that the builders of the standard ships would not be compelled to halt at any stage for the need of any particular material. If supplies have been forthcoming as required, then the shipyards have responded by turning out the vessels at the rate required by the Shipping Controller. In the United States the same check upon the rate of production has been felt, and in order to expedite the construction of ships in the various yards in which the Bethlehem Steel Company has a controlling interest, it has been decided to consolidate these yards under the name of the Bethlehem Shipbuilding Corporation. The capacity of the Bethlehem Steel Company in peace times was well known, and the organisation of these shipyards in conjunction with the Steel Company should do much to increase the amount of tonnage turned out.

Journal Bearings.

The results of experiments made from time to time on lubricated journal bearings have corroborated those obtained by the late Mr. Beauchamp Towers which were presented to the Institution of Mechanical Engineers in 1885. In Towers' experiments it was shown that with an oil bath lubricated bearing a pressure oil film is maintained between the journal and its bearing by the entrainment of the oil by the rotating journal. By means of pressure gauges fitted at various points in the circumference of the loaded bearing, it was found that the intensity of pressure varied from point to point, being zero at the entrance edges and a maximum at a point a little to the off side of the centre line of bearing, and to that side towards which the shaft revolved. The effect of grooves cut in the bottom of a bearing for the purpose of distributing the oil over the surface is a point on which a few engineers are still at variance. The general practice with turbine bearings until a few years ago was to cut these grooves, but experiment and general experience have shown these to be a detriment instead of an aid to the reduction of friction losses. Towers in his experiments proved also that these caused heating at lower intensities of loading; the disturbing of the oil film by the cutting of grooves in the bottom of the bearing will tend to diminution in pressure at the point at which the maximum is required to prevent metallic contact. To obtain better spreading of the oil over the surface, it is usual to relieve the metal at the sides of the bearing at which the pressure is a minimum.

Electric Control of Vessels.

It will be recalled that, in commenting upon the destruction of an "electrically controlled high-speed vessel" in these columns on November 8, we expressed a regret that the vessel had not been captured, so that the method of control might have been revealed. Apparently the vessel was examined by some competent authority before being destroyed, since the Admiralty have been able to issue an interesting account of the equipment of these vessels. It appears that the Germans, disdaining the use of wireless control, which has been successfully utilised in many recent boats of this type, have reverted to the old system of control through a wire which is automatically paid out as the vessel proceeds. But whereas in the experiments carried out in Stokes Bay in 1892 the length of the control cable was 4,500 yards, in this case the vessels carry a drum with between 30 and 50 miles of insulated single-core cable, through which the boat is electrically controlled. The fore part carries a considerable charge of high explosive, probably from 300 to 500 lb. in weight, which is exploded automatically on the vessel being steered into a ship. The boats carry two petrol engines and are capable of running at a high speed. The engines are started, and the crew then leave the boat, which is accompanied by a seaplane—the latter protected by a strong fighting patrol—which signals by wireless telegraphy to the operator on shore the helm to give the vessel. Commenting on these vessels, the Admiralty state that the device is a very old one, a boat similarly controlled having been used in H.M.S. *Vernon* as far back as 1885. The only new features in the German boats are petrol engines and wireless telegraphy signals, neither of which existed then. Nevertheless, it would appear as if these vessels could be developed so as to become formidable engines of war.

Tar Oil as Diesel Engine Fuel.

We recently drew attention in these columns to the attempts which are being made by the Fuel Research Board to develop an efficient method of carbonisation of coal with a view to the production of tar oil and other valuable products, and leaving as a residue a form of carbon which can readily be used where coal is at present wastefully employed. It is of great interest to note that the Diesel Engine Users' Association is encouraging the use of tar oil as fuel in Diesel engines, an action

which should do much to stimulate the economical use of coal by encouraging the extraction of valuable by-products, several of which are of especial importance to the country at the present time. The economical use of coal in this manner should be of great assistance in reducing the present transport difficulties by providing a home-produced liquid fuel in place of the imported product. As an example of the saving in transport, we may instance a Diesel engine plant at Chelsea, in which case the consumption of 700 tons of fuel oil per annum resulted in the replacement of 6,000 tons of coal per annum. It is apparent that if the tar oil can be produced at a sufficiently low cost, there will be a great future for the manufacturers of Diesel engines.

POWERS OF THE SHIPPING CONTROLLER.

TWO broad propositions are established by Mr. Justice Bailhache's judgment respecting the powers of the Shipping Controller. He has power to requisition ships. He has no power to requisition the services of owners. If he sets out to requisition ships and the services of owners the whole transaction is void. If he requisitions the ships and takes them out of the management of the owners as on time charter, the judge's opinion clearly is that a trading profit may be made and retained by the Government. There can be no owners' trading profits unless the ships are managed by the owners. In such a case the Controller is evidently in the same position as a private time charterer in this regard.

This legal decision of principle owes its wide importance to the fact that it affects by application the liner requisition scheme instituted early this year. The present litigation was in the nature of a test case. The circumstances out of which it arose are that on March 5 a letter, written on behalf of the Shipping Controller was sent to the China Mutual Steam Navigation Company, Limited, purporting to place under requisition all the steamers of the line other than those already requisitioned, which were then or might be operated outwards or homewards between the United Kingdom and Far Eastern ports. "You will continue," the letter proceeded, "to run the vessels as for yourselves, though actually for the account of the Government, crediting full earnings and debiting net charges after allowances for all rebates, commissions, &c. You will be advised later as to the arrangements under which you will be credited with hire on requisition terms, &c. . . . To repeat, the general intention is, in a word, that you should run the steamers as for yourselves, though on account of the Government, who confidently look to you to conduct the business with as much zeal and care as if your own interests alone were still involved." The company's ship, the *Keemun*, afterwards made a voyage to the Far East in the ordinary course of her trade laden with a cargo procured by them. They tested the validity of the orders issuing from the Shipping Controller's department by applying to the Court for a declaration that the voyage was for their risk and account and that they were entitled to receive and retain the profits if any. Mr. Justice Bailhache, holding that the Shipping Controller had exceeded his powers by requisitioning the services of the owners, granted the declaration.

In Court the whole matter was very strictly treated in its legal bearings. The argument was directed to the interpretation of the Statute which established the Ministry of Shipping and to the Defence of the Realm Regulations. The case was argued and decided on the claim that the Controller had the right to requisition three things: the ships, the owners' services, and profits. Because the requisition of the owners' services was something beyond the powers granted to the Ministry of Shipping, Mr. Justice Bailhache regarded the whole transaction as invalid. In these proceedings Sir Joseph Maclay would naturally rely upon his advisers to handle the technicalities and formalities. More power was evidently claimed than he intended to exercise, and this we gather from a letter which he has written for publication after the judgment was given. We must quote a passage because it throws a light on his intentions. "It has never been claimed or supposed by myself, or by anyone in my department, that the Shipping Controller had the power to requisition not only ships, but the services and profits of the shipowners, and this was formally stated by the Attorney-General in Court. It has been recognised from the outset that the Liner Requisition Scheme was one which could not be successfully worked without the co-operation and goodwill of the shipowners themselves, which, as I am glad to testify, has, with very few exceptions, been shown in the most generous manner. The scope and details of the scheme have throughout been discussed and worked out in close and intimate connection with the lines themselves, and the negotiations which have been proceeding for many months with regard to the terms and conditions on which the lines are prepared to assist in carrying it out have resulted in the settling of heads of arrangements, which have been accepted by a meeting of liner conferences. The arrangements are wholly voluntary. None of the lines have been compelled to enter into them otherwise than of their own free-will." If this, then, is the policy of the Shipping Controller, what are we to think of the measures that were taken in pursuance of it? The arrangements, he says, are "wholly voluntary," but the letter of March 5 is wholly mandatory. The policy of the department, as presented in Court, was based on command and not on negotiation.

The times in which we live are serious, and there can be no disposition to prolong a controversy with the Ministry of Shipping. Immediate steps have been taken by the Shipping Controller to regularise the position in the light of Mr. Justice Bailhache's judgment. A letter has been sent out formally requisitioning the liners themselves, as the Shipping Controller has every power to do. The requisition is based on Blue Book rates and conditions, subject to any modifications which may be agreed on. The letter goes on in conciliatory terms to state that the Controller feels that he may rely upon the willing co-operation of owners in managing the requisitioned vessels, and it asks for a formal assurance on this point. Owners will be asked to sign the heads of the agreement accepted by the chairmen of the liner conferences. It does not look as if the Shipping Controller will have any difficulty in adjusting the situation. He has a valuable asset in the goodwill and reasonable spirit which have characterised the shipping community, and which Sir Joseph Maclay acknowledges. Of course, it cannot be denied that on several occasions during the war shipowners have been treated very shabbily. Some of the utterances of people now in office were unfair and unjust to them. They were subjected to differential taxation of an obnoxious kind in the Budget, and it was passed by the introduction of prejudice into the debates. Undoubtedly, to some minds, the liner requisitioning scheme appeared—not without justification—to be a method of further annexing the profits of the shipowners without the authority of a taxing statute. Certainly, the bureaucratic spirit in proceeding to requisition formally the services of owners, wears, in the light of events, rather a high-handed appearance. It has received a salutary check. It was just as well to have the status of the owners clearly defined in their dealings with the department.

POINTS AFFECTING PROPULSIVE EFFICIENCY.

WHEN the model of a vessel has been run in an experimental tank and the effective horse-power determined, that is not to say that the actual shaft horse-power necessary to drive the vessel ahead at the particular speed is known with absolute certainty. The trials in a tank simply give the power necessary to overcome the frictional and wave making, or residuary resistance; but, on the average, the actual power which must be installed requires to be double that ascertained by experiment. Generally, when a model is run, no appendages such as bossings, bilge, keels, rudder, &c., are fitted, and an addition to the power must be made for these. The power necessary to overcome the resistance of the ship must be

delivered by the screws, but these in turn give out only a portion of the power actually delivered to them. In some instances the screws give out about 75 per cent. of the power they absorb, in other cases probably only about 55 per cent. is their figure of efficiency. This particular cause of loss in power is that which mostly affects the propulsive efficiency. Besides these the suction caused by the screws on the after end of a vessel causes an augment of resistance which is termed the thrust deduction, and this in turn, unless balanced by the gain which the propellers effect due to the presence of the wake, causes an increase in the power beyond that determined by towing experiments.

It is customary to base the propulsive coefficient on the actual performances of previous ships, the models of which have been run and their effective horse power determined. This is the most accurate manner of determining the actual power required in a future ship. At times, however, when a departure is being made from precedent, it is necessary to form an estimate of what the propulsive efficiency in a new vessel may be. In that case the various factors must be taken into account, and the most probable values assigned to these factors. In spite of experience, and of making the best of the guidance available, this estimate may prove to be well out of the actual result where the vessel goes on trial. One or two cases may be cited. In the case of a large liner, whose form was designed by one well accustomed to such work, the trial performances were rather disappointing, and came somewhat short of the expectations which had been formed. The actual form was as good as could be given, as was proven by model experiment. It was not till sometime afterwards when the question of the influence of depth of water on trial performance was being investigated in connection with another vessel, that it was thought that this was probably the cause of the bad propulsive efficiency obtained in the former case. Such proved to be so, as was proven by subsequent sea experience. Several large warships of a certain class and somewhat similar in design and speed were built a few years ago. When the first of the type went on trial a very high propulsive efficiency was obtained. This high value was not secured in the subsequent ships of the class. According to all analytical methods the conditions were as favourable for the securing of good efficiency as they were in the first vessels, but still the actual results showed the falling off in performance. This case still remains amongst the unsolved mysteries.

Whilst the determination of the actual propulsive efficiency may be a matter of considerable difficulty, certain points may be observed which go towards the securing of the maximum efficiency. The most important, probably, is the choice of the number of revolutions of the screws. In all types of ships there is a number of revolutions which best suit the speed expected, the power to be developed, and the limitations of diameter. The introduction of gearing in turbine work has been with this end in view, and satisfactory results have accrued therefrom. In this connection it should be pointed out that the questions of screw efficiency and turbine efficiency should be considered together when a geared turbine installation is being planned. On the whole, vessels engined with reciprocating machinery are favourably placed as regards propeller efficiency. Those fitted with oil engines are much less favourably conditioned.

A point which has been brought home by the interesting experiments of Prof. Peabody on the *Londe* deserves to be mentioned in connection with the propulsion efficiency of single screw vessels. He found that the position of the screw with regard to the propeller post had a most marked influence on the result. The closer the screw was placed to the post the larger the thrust deduction became. More power, he found, was required for a certain definite speed with the screw placed as far forward as possible than when put further aft. Now, there are practical limitations which enter into consideration which forbid the following out of the logical conclusion, as the rudder post restrains the aft position of the propeller, but it appears that the aperture should be big and that the screw should be placed as far aft in that aperture as possible.

The influence of the angle of bossing, and the direction of rotation of the screws on performance has been prominently brought out by Luke's experiments on "wake and thrust deduction." It has been shown by previous work of Londe and Sadler that the angle of bossing had a material influence on the amount of appendage resistance. Thus, bossing slopes horizontally might cause two or three times the additional resistance that those placed normal to the shell would. It has been shown that if bossings inducing high resistance are associated with screws rotating in a direction which leads to high thrust deduction and low hull efficiency a very bad propulsive efficiency may be expected. Fortunately this association is seldom given, as bossings sloped less than 45 deg. to the horizontal are common, as also are outward-turning screws.

Whilst practical considerations generally determine the *number* of screws for any special ship, it is interesting to find from Pecoraro's experiments in the Spezia tank that two screws should give a higher propulsive efficiency than three, and three than four. He found, when comparing a quadruple with a triple job, that the former had an increase in resistance due to the appendages of the shafts, a smaller wake value and a higher thrust deduction. In present-day vessels of high speed and great power a distribution of this power through a number of shafts is necessary, and in spite of the fact that the propulsive efficiency would seem to be greater with triple screws than with quadruple there is little chance of these experimental results influencing engineers in their choice of number of screws.

The subject of propulsive efficiency is interesting, and at some times perplexing, but the sum of knowledge on the subject is steadily growing, so that its determination may yet be made with greater certainty.

FORCED LUBRICATION TO TURBINE BEARINGS.

AN item of primary importance in the design and operation of turbine machinery is the system of lubrication adopted for the turbine bearings. In view of the high surface speed at which the journals revolve, it is essential for the lubrication of these to be as perfect as possible and that a continuous flow of oil be given to each bearing. To attain this object, the general practice is to install force pumps by means of which the oil may be pumped direct to the bearing under a moderate pressure, which varies from 5 to 10 lbs. per square inch, according to circumstances. Serious breakdowns with turbine machinery are not common, but when trouble does arise on trial trips, it is frequently found to be due to failure of the lubricating system, and it lies with the designer and the operating engineer to give special attention to the arranging and working of this important part of the installation. The force pumps are at all times liable to "stick," and as the unobserved stoppage of these for a few minutes might prove disastrous, it is important that they should be arranged as far as possible in such a position that they can be readily seen and their working observed by the engineer in charge of the machinery.

One system which is frequently adopted is as follows:—The lubricating pumps are made to suck directly from a main drain or reservoir tank placed in the bottom of the ship, and discharge through an oil cooler and filter directly to the turbine bearings. The lubricating oil, after finding its way through the bearings, is allowed to drain into a well in the bottom of the bearing block from which it flows by gravity through the main drain pipe back to the reservoir tank. It is usual to provide for the by-passing of the oil from the cooler in the event of a leak occurring through the tubes of same, and in a similar manner the filters should be capable of being disconnected in the event of their becoming choked by dirt in the oil. It is also found desirable to arrange the piping in duplicate, so that in the event of one system becoming choked the auxiliary leads can be brought into use. Ample surface should be allowed to the oil cooler for reducing of the oil temperature by at least 20 deg. F. with any possible temperatures of circulating water.

It is important for the oil to be kept perfectly clean and free from water; the entrance of salt water into the oil system must be carefully guarded against, and in the event of a leak occurring in the cooler or other parts, this should be rectified at once. It is usual to provide a well in the bottom of the reservoir tank from which any water which may find its way into the system can be drawn off. Care should be taken that suction pipes—as far as possible—are carried above the highest possible level of bilge water in the vessel, so that in the event of a leaky joint in the suction line, dirty water will not find its way into the system and mix with the oil. To obtain proper separation of the water from the oil, the mixture should be heated before running off. A plan sometimes adopted is to fit a small steam coil in the drain tank for this purpose, or a separate tank may be used into which the oil to be dealt with can be discharged. It is found that the oil after being in use for a considerable period deteriorates somewhat in its lubricative property, but if careful attention be given to the filtering and renovation by heating, and if it be allowed to settle for a time its lubricating quality may be somewhat regained. In a system in which every care has been taken in making all joints secure, very little oil need be lost, and any quantity which may be found unsatisfactory for the main engines after treatment in the renovating tank may be used with advantage by the auxiliary engines.

In another system, which is also frequently employed, one or more supply tanks are placed in the engine-room casing at a sufficient height above the turbine bearings, to which the oil pumps discharge, instead of direct to the turbine bearings. From these tanks the oil is allowed to flow by gravity to the bearings under a constant pressure head, the capacity of the tanks being such that in the event of a complete stoppage of all the pumps, the oil supply to the bearings will be maintained for an interval of 6 to 10 minutes. As the pressure of oil in the system is an important matter affecting the leakage and oil expenditure, in an efficient system this should not exceed from 5 to 10 lbs. per square inch at the bearings. Pressure gauges should be fitted to all bearings, and provision should be made for taking all temperatures. By the aid of sight-feed glasses on the outlet pipes from each bearing, observations can be made as to each obtaining its proper proportion of oil and any choking of the supply pipe can at once be detected. The quantity of oil required for lubrication of the main bearings depends on the allotted surface, but care should be taken that ample allowance is made. A good practical rule is to allow for circulation in the system from 200 to 250 gallons per hour for each square foot of projected surface of bearing in direct connected turbines, and at least twice this quantity in high-speed geared work. Other bearings outside those of the main turbines which are not subject to heat conduction from steam parts may be allowed in general from half to one-third the above valves in determining the dimensions of the supply pipes. In the case of geared turbines, ample supply must be allowed for the gearing to prevent overheating of the pinions, since this tends to differential expansion of the pinion and wheel, which, in turn, exaggerates the trouble

PUBLICATIONS RECEIVED.

[*A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.*]

Employment in the Mercantile Marine: With a List of Shipowners who Engage Apprentices. London: The Marine Department of the Board of Trade. 16 pages.

This interesting and useful pamphlet has been issued as a guide to those—or perhaps it would be more correct to say as a guide to the parents of those—who are desirous of finding employment in the mercantile marine. The title needs qualification, however, for it does not deal with the large number who desire to become engineer officers, wireless officers, &c., but deals merely with (i) those entering with a view to becoming officers; and (ii) those entering with a view to becoming seamen. The methods of entry and the qualifications for each class of service are detailed, and the pamphlet concludes with an alphabetical list of the shipowners at the principal ports in the United Kingdom who engage apprentices, the premium (if any), the wages during apprenticeship, and the period of indentures being given. An extremely timely and informative pamphlet.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by Correspondents.*]

STANDARD SHIPS.

Baltic Chambers, 50, Wellington Street,
Glasgow.
November 7, 1917.

TO THE EDITOR OF SHIPBUILDING AND SHIPPING RECORD.

Referring to my letter which you published in your issue of March 9, 1916, and the somewhat hasty reply made by a correspondent and published in your issue a week later, I take the opportunity of calling your attention to the following cutting from the *Glasgow Evening News* of to-day's date:—

NATIONAL SHIPYARDS.

Clydeside will be interested in the news that three out of the four new national shipbuilding yards are to be in the Bristol Channel. So far I have not heard where the fourth is to be, but it is probable that it, too, will be on the western seaboard. The idea, I believe, is that a good deal of work, such as punching and riveting, should be completed inland, and that thereafter the parts should be assembled at the new yards and built into ships by the most up-to-date machinery.

JOHN DUNLOP, M.I.N.A. (John Reid & Co.).

THE REQUISITION OF LINERS.

As a sequel to the action between the China Mutual S.S. Co. and the Shipping Controller, referred to on page 484, the following letter was sent from the Ministry of Shipping on November 17 to liner owners:—

"I am directed by the Shipping Controller to inform you that, in view of the decision of the Court in the case of the China Mutual S.S. Co. *v.* Maclay, he thinks it right to give you formal notice that he hereby requisitions all vessels (other than those already requisitioned by His Majesty's Government, the Government of India, or the Governments of any of the Dominions or Colonies) owned by you and at the date of this letter engaged in liner service within the limits defined in the annexed Schedule.

"The requisition will be on the basis of Blue Book rates and conditions, subject to any agreed modifications.

"This notice of requisition is also to include vessels chartered by you and falling within any of the categories above mentioned, the Controller taking over the rights under the charters, unless cancelled, and assuming all obligations towards the actual owners of the vessels.

"In view of the tenour from the outset of the negotiations which have been proceeding between the Controller and the Chairmen of the Liner Conferences during the past nine months, the Controller feels he can rely upon your willing co-operation in managing the vessels so requisitioned; but it has become desirable that he should receive from you at the earliest possible moment a formal assurance on this point. On receipt of this assurance he will invite you to sign, if you have not already done so, the Heads of Arrangement of which the terms have already been accepted by your representatives, the Chairmen of the Liner Conferences, with the exception of Mr. Holt.

"The Controller does not anticipate unwillingness on the part of any owner to take his appropriate share in the administration of the liner scheme; but in the event of any owner being unwilling to give the assurance above referred to, it is essential that the Controller should be informed at once in order that he, in his position as charterer of the vessels, may make such alternative arrangements as may be necessary.

"It will, of course, be understood that this letter is without prejudice to any action which on further consideration it may be found expedient to take for the purpose of meeting the situation created by the judgment of the Court, so far as relates to the past."

INLAND SHIPBUILDING.

By W. VEYSEY LANG.

There are three things, more than any others, that have been urged by far-seeing men during the last 20 years, and which—had they been done—would be of untold value to the nation at this time. They are :—

1. Two years' wheat supply.
2. Channel tunnel.
3. Forth and Clyde Canal.

On the two former nothing more than silent meditation is necessary; but of the last, one might suggest a co-operative scheme.

In *Shipbuilding and Shipping Record* of August 9 it was stated that the interest in this project had revived ; and that the Admiralty were interested in the matter. Incidentally, one wonders why Rosyth was ever chosen as a fleet base without the back door of such a canal being open for mobilisation or retirement, or to permit of rapid concentration for surprise attack on either side of the British Isles.

But ever the broad principle of National Service or commercial advantage is stultified by the controversies of ways and means, and questions of cost. It should not be supposed that the Kiel Canal was made to show a profit ; but it has been an enormous asset to the German Navy.

It has been pointed out by others that the saving of time on a voyage from Leith to Glasgow would not be so very great ; although 590 nautical miles against 45 land miles ought to "give one furiously to think," even though the canal speed per hour might be only one-third of the sea speed, or less ; yet the risks of the Pentland Straits route—with its winter storms, delays by fog, and record of wrecks and millstream tides—is a factor seamen know only too well.

However, the above remarks are by the way ; the object of this article is to suggest a way and means of making such a waterway—or any such inland navigable canal—a commercial asset, and that is by the laying down of yards for shipbuilding—that crux of our national prosperity in the near, the very near future—on the banks of the canal, preferably whilst the waterway is being constructed.

Our present centres of shipbuilding, and the banks of the rivers that they line, are congested, and little or no frontage or depth of land is available for development. Nor is the opening up of new sites for such enterprise easy to contemplate, chiefly on account of labour and lack of accommodation ; and difficulty in regard to seashore or river right, and of tidal and launching space. But such a waterway as the Forth and Clyde Canal would pass near to established towns and centres of industries, and where labour could quickly assimilate itself to, or be absorbed into, such an enterprise as ship construction with its ramifications of engines, boilers and hulls.

It is only possible to *launch* newly-built hulls into a wide water space—preferably tidal, so that the maximum of height of tide ensures the minimum of plunge and risk. But why launch at all or build on ways one might ask ? In His Majesty's dockyards some vessels are built in dry docks and are floated out ; but for mercantile vessels a much simpler, and cheaper, form of building dock would be required. Assume that the water level of a ship canal is 6 ft. below the level of its locks and quay walls ; that the floating (launching) draught of an 8,000-ton (d.w.) steamer's hull is 6 ft. 6 in. mean, and height of blocks for riveting under the flat of bottom 4 ft. 6 in. ; add a foot or so for floating clearance and you arrive at the fact that a shallow dry dock of a depth of 18 ft.—with only 13 ft. 6 in. depth on sill (or 7 ft. 6 in. of water over sill)—is required for constructing such vessels inland. Such a dock would be only half the depth, would need to carry much less keel weight, and would cost less than one-third that of a dry dock to accommodate a fully built and equipped ship. The

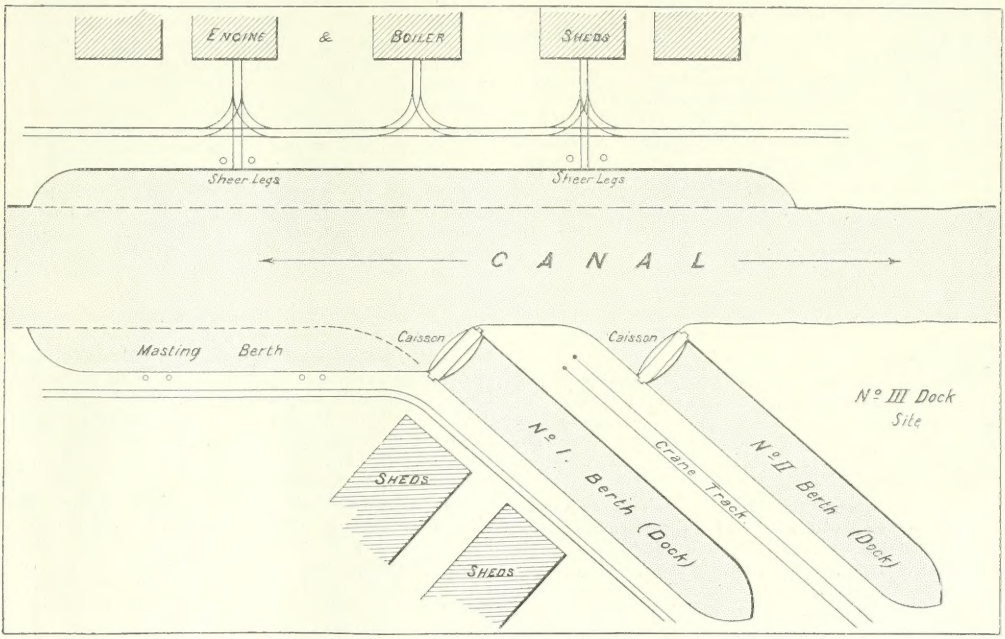


Diagram of suggested Arrangement of Shipbuilding Docks on Canal Bank.

entrance gate would be low in height and comparatively inexpensive. Flooding arrangements for testing double bottom or for final flotation, and the pumping arrangement for emptying such a dock only require to be of small capacity. Such a dock would be wide at the top and with easy altar steps.

It is becoming usual now to build ships under cover; from the earth surface to the underside of the cross-ties of such a structure (to cover an 8,000-ton d.w. steamer) would require a height of, say, 60 ft.; for a similar shed over a construction dock the height would only require to be 42 ft.

The saving in height of shed, of making and breaking keel block and launching ways—say three, or even four times per annum—and the launching expenses, risks and insurance and dislocation of work, would go far towards the cost of dry dock *versus* building berth. But when it is taken into account (although very difficult to calculate into figures), the lessened height of cranes and derricks to lift plates and materials, the lesser staging and laddering, and the reduction in "walking time" of thousands of journeys to and from the upper decks and superstructure, then it may be confidently asserted that there would be material gain in such a project, in cost and time of ship construction, if thoughtfully planned and carried out.

For the better illustration of this suggestion the accompanying diagram has been prepared, showing two such constructive docks at an angle to the waterway of (say) 35 deg.; on the opposite side it would be necessary to have a "bulge," or lay-by, in the canal to clear a vessel out of dock. Such a berth could be the outfitting quay for the machinery, masting, &c. There would be no agitation or alteration of the canal water level, for ships would be put out of dock with bottoms painted and propellers on, and the trial trips would take place at either sea end of the canal in the usual way.

Such a dock, if the strata was of red sandstone or easily wrought formation, would be very cheaply quarried out; otherwise cement built docks are now usual and cheap. Lock gates would not be required, only a floatable caisson, which would form a cartway in ordinary times.

The lay-byes would only require to be to the depth of a fully equipped water-ballasted ship and not to the navigable depth of the canal for loaded ships. Needless to say, such a dock, or docks, together with quays and entrances, would cost much less if arranged for and excavated at the same time the canal was made, thereby saving cofferdam and attendant expenses.

Further details naturally suggest themselves as one considers such a project; for instance, such a dock or docks would always be available in dull times or in emergencies as dry docks for the repair and overhaul of barges, dredgers, floating docks, destroyers and other light draught vessels; but the main idea is set forth as above. The figures named are approximate and only by way of illustration, and the diagram has not been drawn to any particular scale.

INSTITUTION OF NAVAL ARCHITECTS.—The date for the opening of the next annual meetings of the Institution is fixed for Wednesday, March 20, 1918. The Council announce that they will be pleased to consider papers on subjects relating to Naval Architecture or Marine Engineering. The Council also announce the offer of a scholarship, designated the "Institution of Naval Architects' Scholarship in Naval Architecture," and the "Earl of Durham" prize, which will be offered for competition among students of the institution in 1918. All students (being British subjects) who have been elected at or before the annual general meeting of the institution (March 20, 1918) will be eligible for this scholarship, subject to the conditions named below. The scholarship is of the annual value of £100, and is tenable for three years. Candidates for the scholarship must forward a written application to the secretary of the Institution of Naval Architects, 5, Adelphi Terrace, London, W.C.2, to reach him not later than January 15, 1918, and to whom all communications with respect to the scholarship should be addressed.

AN IMPROVED METHOD OF SHIPBUILDING.

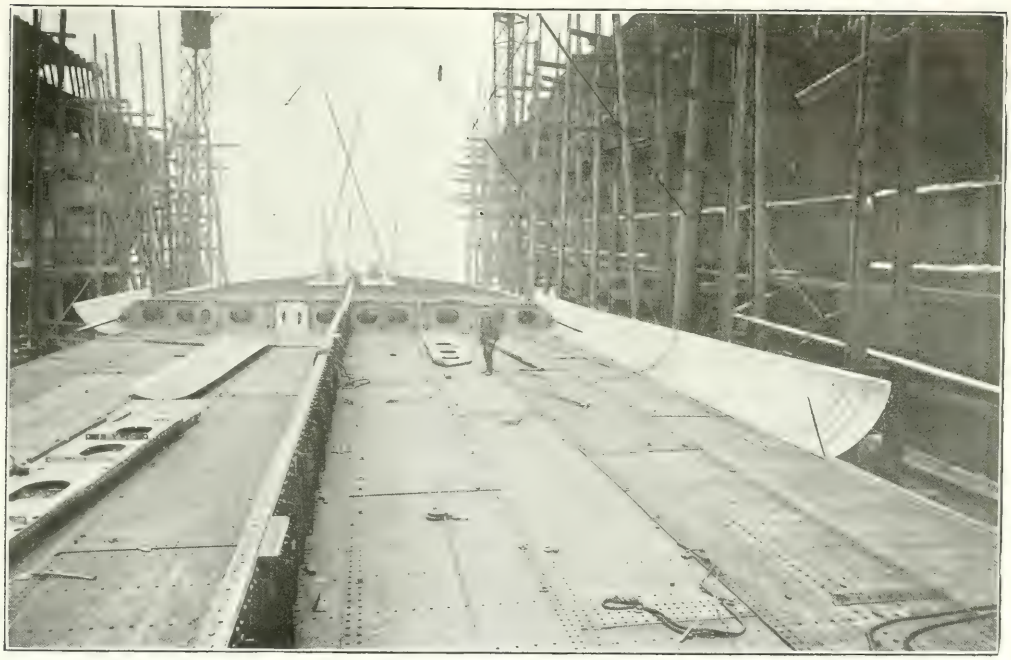
Whilst the size and weight of ships has increased enormously within recent years, the method of construction has not materially changed. Transverse framed vessels are constructed to-day in very much the same way as they were 50 years ago, and the method of erection adopted is still very similar to that which found favour in the early days of the steel ship. That some change from the old system of ship erection is possible is proved by a visit to the yards of the Greenock and Grangemouth Dockyard Co., Ltd. This company has for many years been building cargo steamers upon a system which differs considerably from that adopted in the majority of shipyards, and on a recent visit to their yard at Greenock—the same methods are employed at Grangemouth—we had the pleasure of studying the system of erecting ships which has been devised by Mr William Millar, the managing director of this company.

The centre girder and keel plate is erected as usual, and strakes of shell plating on each side of the keel plate are bolted up in position. The floors are then connected to the shell plating and centre girder, and bolted in position; after the floor plates are in place they are supported at the ends. The remainder of the shell plates to the upper turn of the bilge are then bolted up in position, and the whole of the bottom plating is faired up. The inner double bottom plates are also ready to be put in position, and the whole of this work can be done in a few days. No templating or mould making is required for these plates, owing to the system adopted of preparing the plates, as described below.

Whilst work on the double bottom is going forward, the stern frames are being set at the furnace, which is a slow job. Simultaneously a different set of men are busy with the midship frames which form the parallel part of the vessel, and the side plating is also being punched and prepared, so that it may be erected along with the frames.

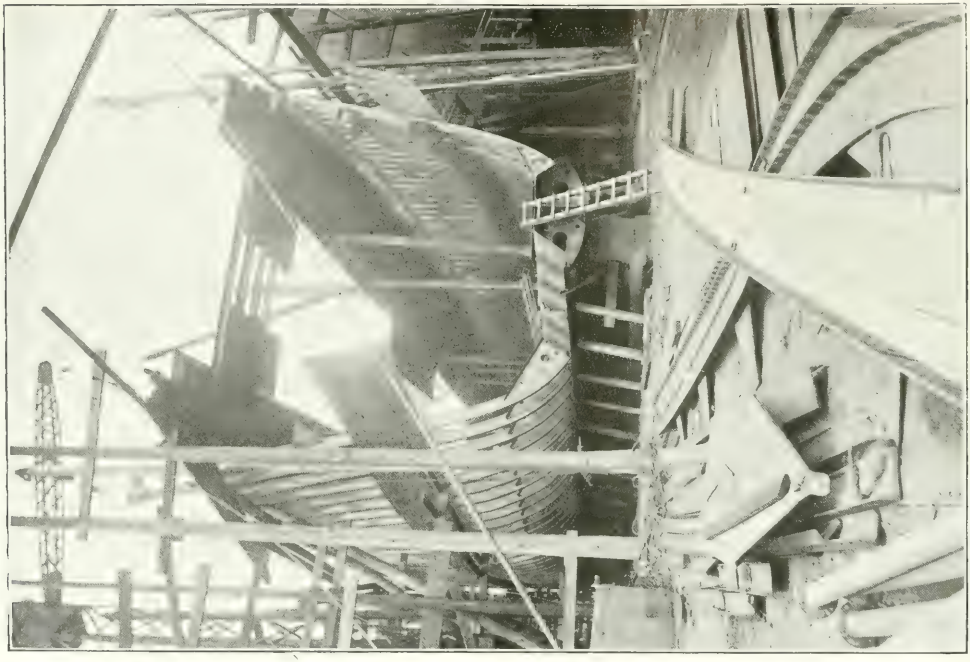
The accompanying illustrations give a very good idea of the method adopted in the erection of a cargo boat, and show an 8,700 ton vessel in various stages of construction. The first photograph shows the centre girder and bottom plates in position. The double bottom is seen in the process of erection. The second photograph is taken from inside the hull, looking aft, showing the after frames and shell plating erected from the stern. On the next page the upper photograph, taken from outside, looking towards the starboard bow, shows the tank top practically completed, the frames are seen secured in position to the tank sides, the shell plating being also in process of erection; whilst the lower photograph, taken from inside the hull, gives a good idea of the degree of completeness attained in building the straight portion of the vessel before the stern or the bow frames have been put up in position. The frames and shell plating erected simultaneously are seen, together with the deck beams in way of one of the cargo hatchways.

The rapidity of construction, and the simultaneous erection of frames and plates is rendered possible in a very large degree by the utilisation of automatic multiple punching machines. These machines, of which two different types are employed, one type for dealing with the plates and the other for the sections, have been constructed and installed by De Bergue & Co., Ltd., Manchester. The shell plates are ordered in the early stages, in fact they are almost the first thing ordered. These plates are 26 ft. long by 78 ins. wide by $\frac{3}{4}$ in. thick, and are put through the machine by means of which the holes are punched without any marking off or templating, it being only necessary to mark off the length of the plate and the position of each frame. It has been the practice in this shipyard for the last 14 years to do the bottom plating, the midship plating up the sides, also the tank top and the deck plating with this machine. It is found that the holes are perfectly fair, and better workmanship can be obtained with this machine than by the single punching of the plates as is usually adopted. An automatic angle or section punching machine has been fitted, capable

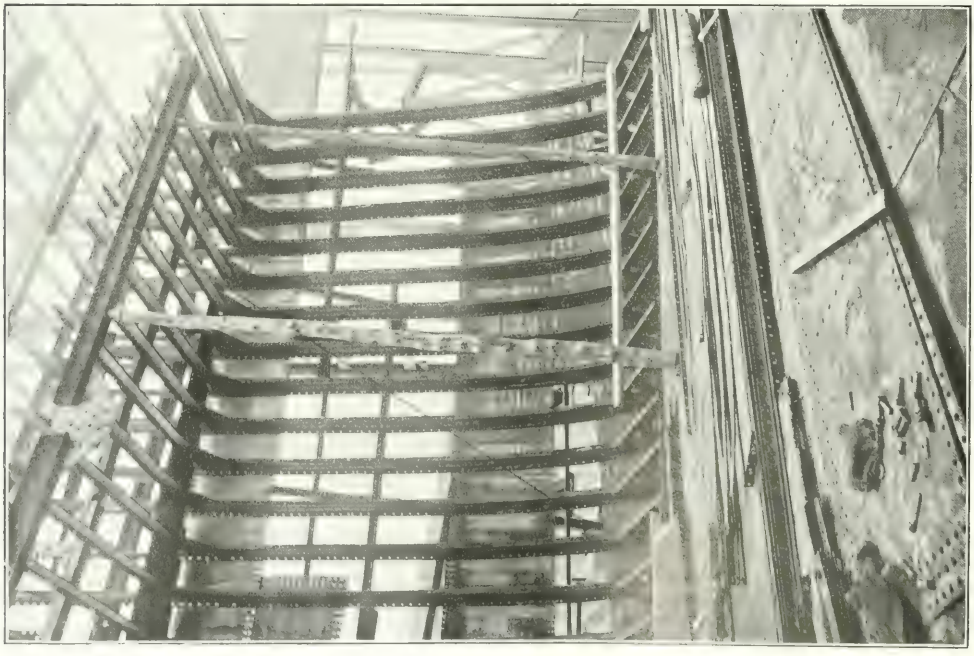


Erecting the Double Bottom.

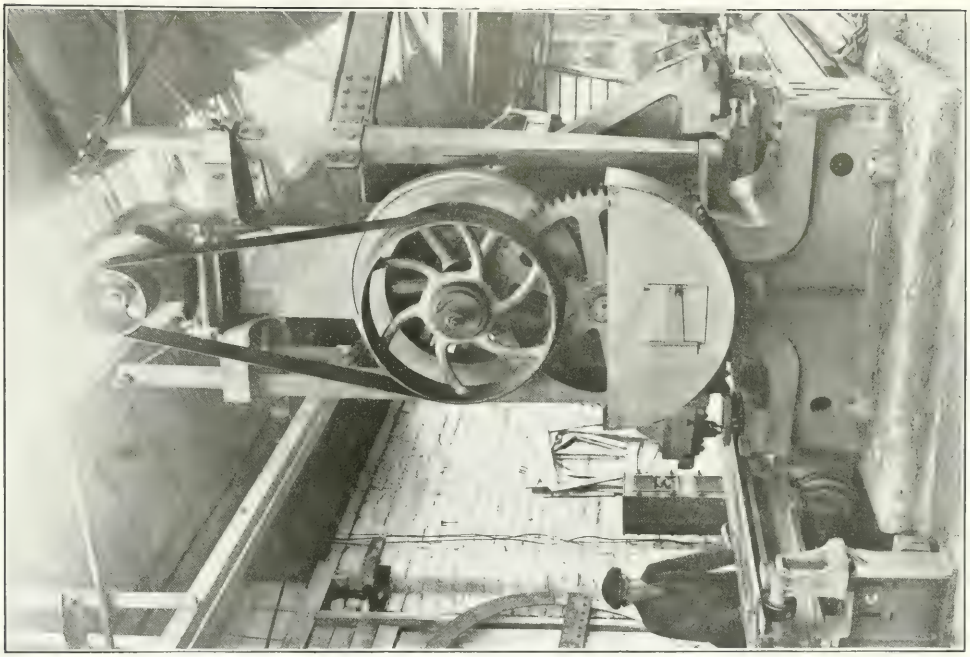
Stern Frames and Shaft Tunnel.



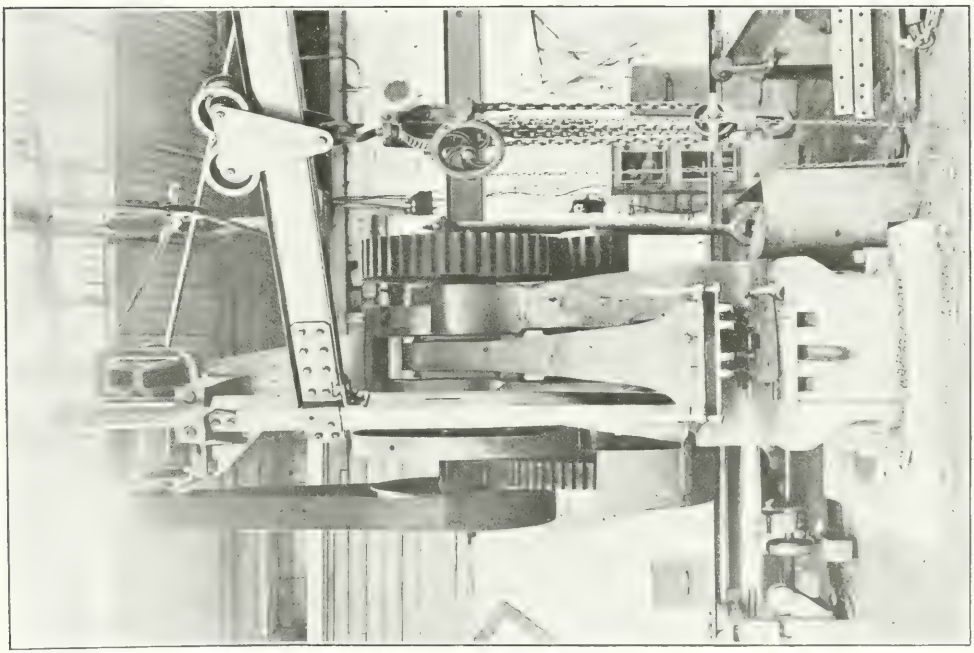
Framing and Plating Middle Portion of Hull.



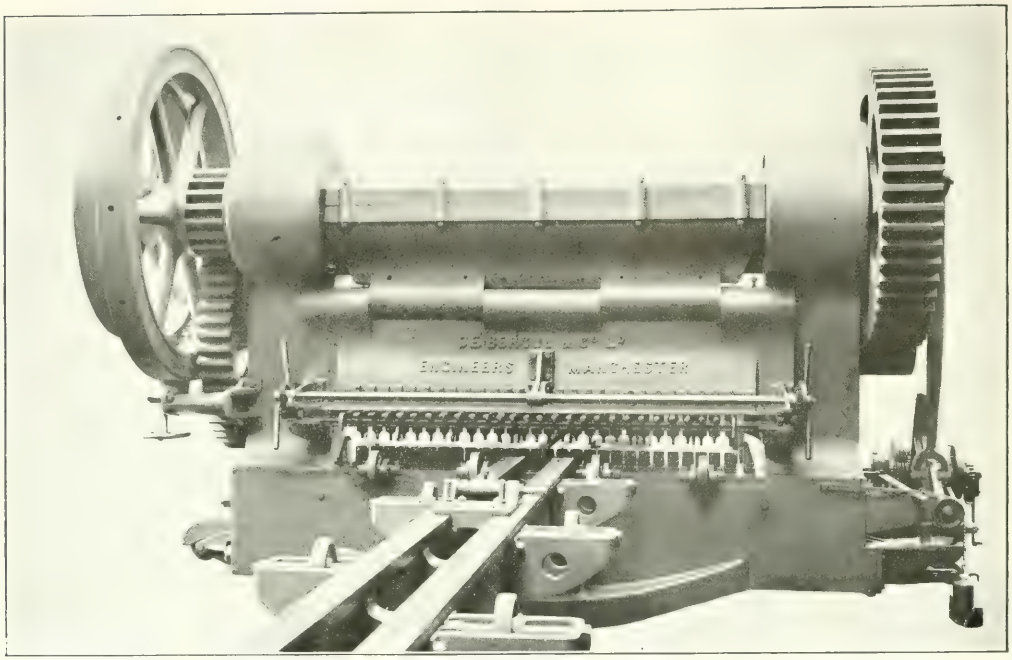
Deck Beams in Way of Cargo Hatch.



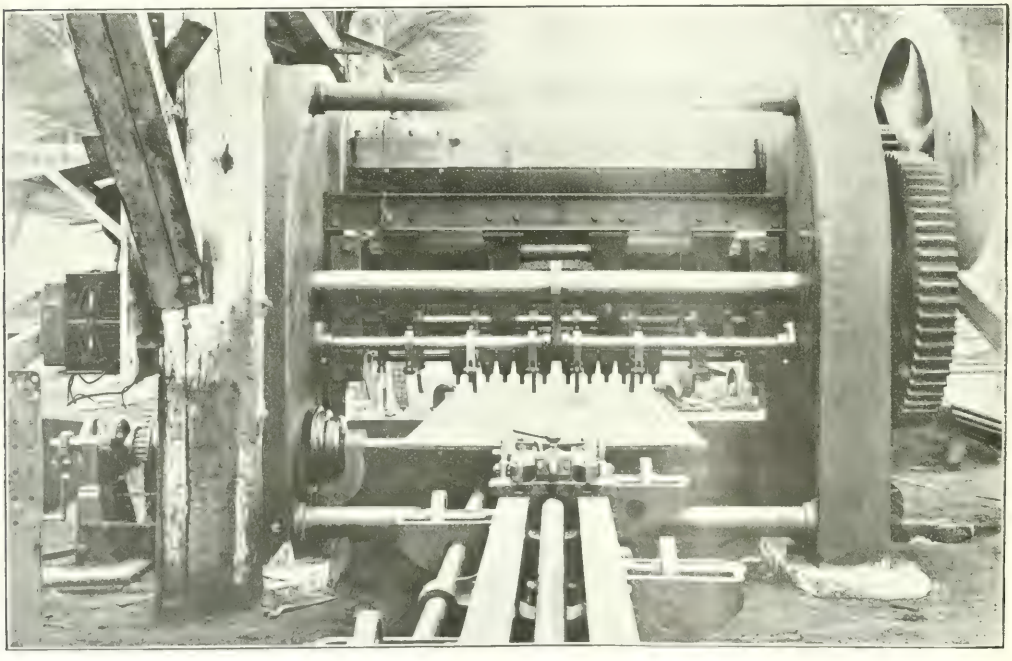
Automatic Section Punching Machine.—Side View.



Automatic Section Punching Machine.—Front View.



Automatic Multiple Punching Machine for Plates.



Automatic Multiple Punching Machine, showing Plate Punched.

of punching channels or angles up to 12 inches deep, this being the first automatic section punching machine fitted in any shipyard in Great Britain. The machine is capable of punching bars 60 ft. long, and can punch the holes from $2\frac{1}{4}$ in. centres to 8 in. centres, advancing by one-eighth of an inch as desired. Since this section machine was introduced, the holes through the frames have been found to be of exactly the same pitch as those in the shell plating, thus ensuring good workmanship in riveting up.

About 50 per cent. of the total shell plates are prepared in the multiple punching machines without any templating; about 70 per cent. of the plates required for tank tops and decks are prepared in this way. Not only are the shell plates and deck plates for oil steamers punched in these machines, all the bulkhead plates are thus prepared, and by this method it is apparent that, not only is the workmanship better, there being no need for rimering the holes, but much time is saved in the building of a vessel. If the supply of material can be obtained as required, the time saved is from two to three months.

A new method has been introduced into this country which dispenses with all moulds or loft work in marking off and preparing the remaining shell plates, in order that they may be punched so as to be ready for erecting along with the frames, the shear and all other particulars being taken direct from the scrieve board. By this method of expanding the shell plating direct from the scrieve board, the whole of the shell plates of the ship are punched, and ready to be erected the moment the frames are up. Moreover, the whole of the plating can be prepared under cover, and thus the workmen are employed full time, regardless of the weather. Nearly the whole of the riveting is done by means of a very complete installation of pneumatic riveters, the bottom and side shell rivets, one inch in diameter, being riveted with rapidity and ease, and with far less fatigue for the workmen than with hand riveting. The caulking is also carried out by means of pneumatic caulkers.

A description of the capabilities of the two types of multiple punching machines may prove of interest. Briefly, the machines are provided with a multiplicity of punches, the distances between which can be varied. The plate or section is gripped and passed automatically through the machine, the rate of feed being adapted so that the material is punched with the holes at any required distance apart.

The machine for dealing with sections has a double punch, being capable of punching, at one stroke, two holes 1 in. diameter through mild steel $\frac{3}{4}$ in. thick.

It can deal with bars up to 60 ft. in length, and is arranged for punching angle bars, bulb angles, channels and zed bars, bulb or ordinary angles down to 3 in. by 3 in., channels and zed bars from 8 in. to 15 in. deep, and is usually arranged for automatic punching at one side only, with preparation so that the second side can be fitted with automatic apparatus later on if desired. On the automatic side the machine is fitted with a leading bed provided with suitable rollers for guiding and supporting the different sections, with independent roller stands on the trailing side of the machine for the support of the bar before it is punched, the guide rollers on vertical axes on the leading side of the machine being fitted with ball-journal bearings to minimise the friction.

The punch fittings are capable of punching holes in line either lengthways or across the bar, or zigzag, each punch head being fitted with a separate organ stop. The steel tables carrying the punch and die holders are provided with suitable adjustment to assist in obtaining different pitches. The main frame is formed in a single massive casting provided with suitable sliding surfaces for the support of the oscillating lever, which is driven at the top through a powerful eccentric shaft.

The machine is usually arranged for driving by electric motor [illegible] jib crane is fitted, 28 ft. radius, to lift 25 cwt., arranged to swing through a complete circle. This machine is also fitted with an arrangement for advancing or retarding the feed by small increments as required. By means of this arrangement an irregular pitch, slightly greater or less than the standard pitch, can be introduced at suitable intervals as required during the progress of the bar through the machine.

The automatic punching machine for plates, as usually made, is capable of taking in and punching at one operation plates 7 ft. 3 in. wide by $\frac{3}{4}$ in. thick, and up to 31 ft. in length. It can also be used for dealing with plates up to $1\frac{1}{8}$ in. thick as referred to below. The machine can punch at one stroke 18 holes $\frac{15}{16}$ in. diameter through a mild steel plate $\frac{3}{4}$ in. thick, and, by means of the special arrangement provided for coupling the stopbars together, the close-pitched holes across the ends or butts of a plate may be punched in two successive strokes. As an alternative the machine will punch at one stroke, six holes $1\frac{1}{16}$ in. diameter through mild steel plates $1\frac{1}{8}$ in. thick, or, of course, 12 such holes in two successive strokes.

The machine is usually supplied with one set of 29 punch and die holders adjustable to a minimum cross pitch of $2\frac{9}{16}$ in. A second set of fittings is supplied for heavier work. Each punch head is fitted with a separate organ stop, so that the punches may be worked either singly or in groups by means of the four drawbars provided, without stopping the progress of the plate through the machine. The machine is fitted with an arrangement for advancing or retarding the feed by small increments as required. By means of this arrangement an irregular pitch, slightly greater or less than the standard pitch, can be introduced at suitable intervals as required during the progress of the plate through the machine. A hand motion is also provided for assistance in putting in odd pitches. The grippers which secure the plates to the travelling carriages are made with a cross-traversing motion of 2 in. on each side of the centre line to facilitate the punching of zigzag holes in the butts. An automatic conveyor is provided working inside the punching bed to receive the burrs as they drop from the dies, and deliver them into a box placed at one side of the machine.

As has already been stated, all templates and marking off are avoided. All that it is necessary to do is to put a chalk line down the middle of the plate and centre-punch the plate on this line close to each end for attachment of the grippers on the travelling carriages. The position of the frames and of any odd pitches should be roughly indicated by chalk marks on the plate, which is then passed through the machine and punched from end to end.

The photographs on page 491 show one of the section punches installed in the shops of The Greenock and Grangemouth Dockyard Company. It is a twin machine; the left-hand side having two punches, is fitted with the automatic travelling gear, and in the upper photograph an angle bar can be seen passing through the machine; the right-hand side has four punches, but the automatic travelling gear has not been fitted. The lower photograph taken from the front shows the automatic travelling gear on the other side of the machine, and gives a good idea of the details of construction of the machine itself. On page 492 two photographs of the plate-punching machine are reproduced. The first picture is a general view of the machine as built and clearly shows the multiple punches and the automatic travelling gear. The second picture taken from the opposite side shows one of the machines installed at the shops of The Greenock and Grangemouth Dockyard Company, Ltd., and a plate is seen in the grippers during its passage through the machine.

A moment's consideration will serve to show that by the adoption of these machines a large amount of time and labour is saved in the construction of cargo vessels, and it is a matter for surprise that more of these machines are not installed in other shipyards. Any attempt made in the direction of cheap and rapid construction is worthy of the earnest consideration of shipbuilders, and the use of these machines certainly points to a way of attaining the end in view.

SAFETY OF TORPEDOED VESSELS.

A good deal of attention has lately been directed to a certain proposal having for its object the rendering of merchant vessels more or less immune from torpedo or mine explosions. This proposal is, that so far as possible compartments should be airtight in order that if water is admitted into the compartment the air already there may be prevented from escaping. If this air can be locked in, the volume of water admitted will be very considerably reduced, and in certain cases the amount might be less than 40 per cent. of the volume which would enter if the compartment were not airtight. Take as an actual example the case of a compartment of uniform section in the vertical direction, having its upper end, say, 4 ft. above the water line and its bottom 26 ft. below the water line; if the bottom of this compartment is punctured, water will be admitted to a height of about 10 ft. only, whereas the depth of the compartment is 30 ft. Again, assume a compartment having its bottom 26 ft. below the surface and its top 2 ft. below the surface: if the bottom is punctured, water will only rise in the compartment to a height of about 11 ft. On the face of it, there is a good deal in the idea, but it must be looked at from many standpoints before it is possible to correctly assess its value.

In the first place one has to consider the possibility of arriving at the requisite degree of airtightness with ordinary conditions of building. So far as that is concerned, it will be generally granted that, with normal practice so far as spacing of rivets, caulking, &c., is concerned, there is little doubt but that the joints of plating, &c., can be made reasonably airtight against a pressure of from 5 to 10 lbs. per sq. in. With lapse of time this degree of airtightness would probably improve due to rusting up. In some shipyards it is fairly common practice to give the bulkhead plating a hose test from an open pneumatic air pipe in order to pick up leaks, and with good work no air passes through the bulkhead, although the jet is issuing at from 80 to 100 lbs. pressure. Special attention would have to be paid to the stiffening of the deck to withstand the air pressure, as the side on which the pressure will come will be slightly concave and of large area, and it will be necessary to anchor the deck to the bottom of the hold with a sufficient number of stout ties, which might be either in the form of hold pillars, or wire stays fitted with tightening screws.

One of the most important things to arrange for is the airtightness of the deck openings. This is not a difficult matter if the openings are small, *i.e.*, not more than about 12 sq. ft. in area, but where they are larger than this, the problem is a more difficult one of solution. It can only be satisfactorily dealt with by fitting solid steel hatches with ample stiffening bars and a sufficient number of holding down bolts. When secured, these covers should be shored down from above and the joint should be formed with a rubber or leather seating. Ventilation, supply and exhaust pipes should be run down to within about a third of the height of the compartment from the bottom, when they will be sealed on the entry of the water without the loss of much of the air originally in the compartment. Speaking tubes should have a flexible end so that when not in use the open end of the pipe drops to within a few feet of the bottom of the compartment where it will be sealed should water enter, as in the case of the ventilation pipes.

So far none of the necessary conditions appear to be much outside of ordinary practice except in the case of the hatches, and even with these there are certain well-known types of cover which could be readily adapted to meet these requirements. Beyond the necessity of paying as much attention to the riveting of the top of the compartment as to the bottom and the fitting of pillars which will be effective in tension as well as in compression, or else the fitting of wire ties in addition to the pillars, the builder is called on for little extra work. When complete, the vessel should present very little difference from a cargo carrying point of view to any ordinary vessel, the principal difficulty being that the hatch covers might be a little more awkward for handling than the covers usually fitted, and the ventilation of the holds might not be quite so good as in the normal ship. The additional hold pillars and ties would render the work of cargo stowing more lengthy, but not to any appreciable extent.

The extent to which the precautions taken would be of service in the case of a vessel actually receiving damage would, however, depend entirely on the nature of the force causing the damage. For instance, the effect of any damage which did not involve the straining of the tops of the bulkheads or the deck forming the roof of the compartment and which did not carry the damage far up the side of the compartment, would be very considerably minimised if the compartment were originally airtight and if the communications to it were so fitted as to be automatically sealed by the entry of water. Thus, the results of damage due to grounding, collision, or straining of the bottom might be very adequately provided against by the adoption of this idea. At present, however, it is essential to provide against damage to vessels due to explosions either of torpedoes or mines, and in this connection the scheme is open to very serious objections. Time and again it has been demonstrated that where the original arrangement of the compartment has been such as to render it more or less airtight under normal conditions, the force of the explosion has been so contained in its initial intensity as to result in severe straining of the adjacent bulkheads, the straining of the deck over and in some cases the blowing out of the opposite side of the ship, in fact the condition of the vessel after the explosion has been greatly prejudiced by the fact that the explosion has resulted in seriously impairing the watertightness of the bulkheads and the deck over. From this point of view, therefore, there are very sound reasons against the adoption of the idea, as the airtightness of the compartment is ultimately destroyed by the explosion and the effects of the explosions are rendered more serious, without any compensating advantages.

From the point of view of meeting damage due to mines and torpedoes, it is considered that a much more useful purpose would be served by arranging that the sides of the compartments should be thoroughly watertight, but that the deck over should be provided with covers capable of being efficiently fastened so as to prevent the entry of water from above under a comparatively small head, but which covers would provide a very slight resistance to the venting of any sudden and large increase in the air pressure in the compartment. The provision of a ready vent as indicated would very largely prevent the widespread structural damage which otherwise has to be faced when any attempt is made to confine within comparatively small limits the tremendous air pressures generated by a torpedo or mine explosion.

COALING AT CRISTOBAL.

The Captain of the Port of Cristobal has issued the following notice with respect to coaling vessels:—

"In the past considerable difficulty has been experienced and extra and unnecessary expense incurred by the Panama Canal in coaling vessels at cargo docks, due to the fact that this office has been entirely ignorant of arrangements made between the agents and coaling-station authorities.

"With a view of eliminating any misunderstanding between those concerned, it is directed that all arrangements for coaling vessels at this terminal be made direct with the Port Captain's office.

"Every effort will be made to expedite the coaling of all vessels, but if, after arrangements have been made with agents or masters and coaling cannot proceed, through the fault of the vessel or its agents, the expense involved will be charged against the ship.

"This office will determine the time, place, and method of coaling all vessels with due respect to convenience of all concerned.

"Agents and others interested in the coaling of vessels are requested to consult this office freely in order to cause as little delay as possible."

THE NAUTICAL COLLEGE AT PANGBOURNE.

Opening Ceremony.

On Friday last, Sir Thomas Devitt, Bart., received a large party at Pangbourne to witness the ceremony of opening the new Nautical College by Vice-Admiral Sir Herbert Heath, K.C.B., Second Sea Lord of the Admiralty. Among those who were present on this interesting occasion were Lady Heath and Miss Heath; Mr. P. H. Devitt, partner in Devitt & Moore, and Manager of the Orient Line, and Miss Devitt; Admiral Sir Wilmot H. Fawkes, G.C.B., K.C.V.O., LL.D., Representative of the Admiralty on the Consultative Committee; Rear-Admiral Edmund Jervoise, Royal Naval College, Greenwich; Sir Alan Anderson; Sir Raymond Beck, Chairman of Lloyd's; Captain Sir Acton Blake, K.C.V.O., Deputy-Master of Trinity House; Captain Young (representing the Board of Trade); Mr. A. Hunt (Union-Castle Mail Steamship Company, Ltd.); Captain Benjamin Crimp (Booth Line); and Mr. B. D. Loch (Cunard Steam Ship Company, Ltd.).

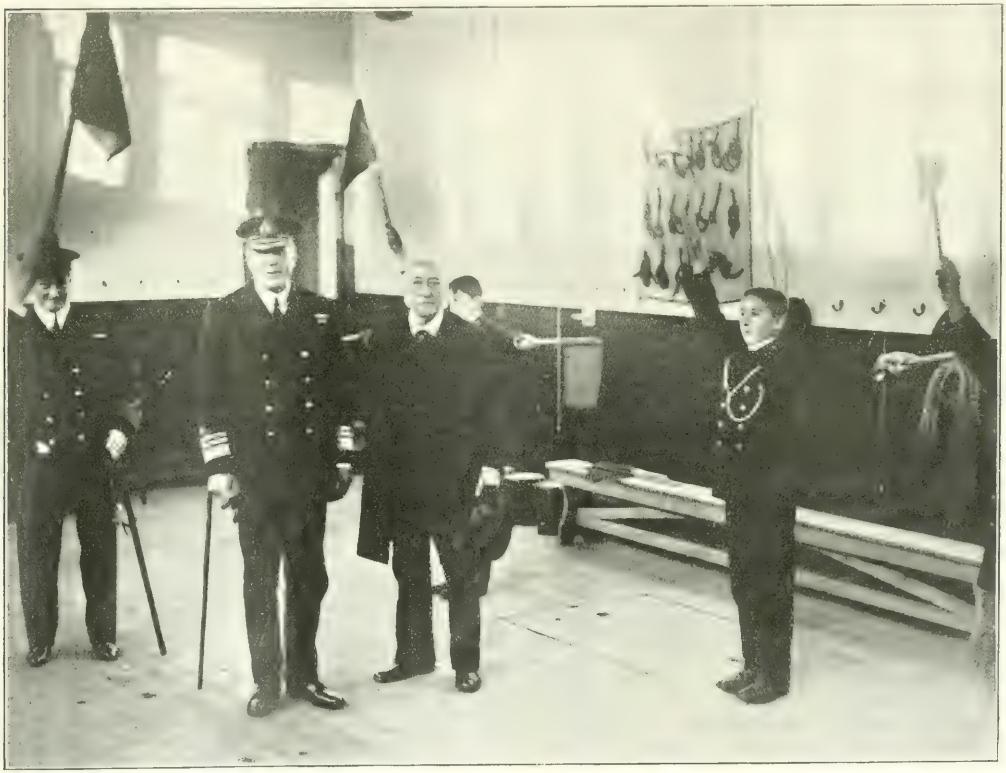
The visitors were met at Pangbourne Station by a number of motors, and were driven to the riverside residence which has been purchased for the purpose of forming a miniature dockyard, where the boats for the instruction and use of the cadets are stored and maintained.

Proceeding thence to the college, they were welcomed by Sir Thomas Devitt, the senior partner of Devitt & Moore's Ocean Training Ships, Ltd., and entertained to luncheon in the cadets' dining hall, where the company, including the 37 cadets, numbered over 100.

After luncheon, Sir Thomas Devitt submitted the toast of "The King," which was loyally honoured, and he then called upon Vice-Admiral Heath to declare the College open. In the course of his remarks the Chairman read letters of apology for inability to be present from among others, the First Lord of the Admiralty (Sir Eric Geddes), and Sir Thomas Sutherland, Chairman of the cadet-training ship *Worcester*.

In sketching the history of the training scheme Sir Thomas Devitt said that in the year 1890, Devitt & Moore, in conjunction with Lord Brassey, inaugurated a system whereby boys who intended to become officers in the Merchant Service would receive a thorough education to fit them for their career. Since then the firm have received many hundreds of cadets and given them a practical training in their well-known sailing vessels which traded between this country and Australia, viz., *Harbinger*, *Hesperus*, *Macquarie*, *Illawarra*, *Port Jackson* and now the *Medway*, and these cadets have, after completing their training, become valued officers in the Mercantile Marine.

A few years ago a company, under the style of Devitt & Moore Ocean Training Ships, Ltd., was formed to carry on the training scheme, and the following are among the shareholders:—The Union-Castle, the Cunard, the Orient, the Booth Lines, the Royal Mail Steam Packet Company, the Pacific Steam Navigation Company, and T. & J. Harrison.



Vice-Admiral Sir Herbert Heath, K.C.B., Sir Thomas Devitt, Bart., and Captain Montanaro, R.N. (ret.), inspecting a Class in the Flag Room.

The training which they were now in a position to give the lads was still more efficient and practical than in the past, and the cadets who entered the college would have the added advantage of open-air training under the best conditions and in most charming surroundings. The Board of Management were exceedingly fortunate in having secured the services of Captain W. H. F. Montanaro, R.N. (retired), an officer whose experience peculiarly fitted him for the position of Captain-Superintendent of the Nautical College, and he knew of no man who could have brought the institution into such a good state of order as Captain Montanaro in so short a space of time. In conclusion, Sir Thomas Devitt emphasised that the college was not a charitable institution, but was kept up by the fees received in respect of each of the cadets.

Vice-Admiral Sir Herbert L. Heath, who was cordially received, in declaring the college open, said that while there was not much history attached to the institution, it had a great future. Such history as it had was contained in the circumstances that, thanks to the generosity and patriotism of Sir Thomas Devitt, the Nautical College, Pangbourne, had already been started in continuation of the work of training lads for the sea which had been going on for many years. Speaking as a naval officer, and representative of the Admiralty, they welcomed any institution of that nature, which would provide a good start and thorough training for the future officers of the Mercantile Marine and Royal Naval Reserve. In days gone by naval officers perhaps did not quite see eye to eye with those of the Mercantile Marine, and *vice versa*. They may not have appreciated each other's good qualities. But the war had altered all that absolutely.

"I should like to know," Vice-Admiral Heath asked, "where the Royal Navy would have been had it not been for the Mercantile Marine, officers and men? But I should also like to know," he added, "where the Mercantile Marine would have been had it not been for the Royal Navy. The war has brought us close together. We understand and appreciate each other better."

Vice-Admiral Heath mentioned the appointment of Admiral Sir Wilmot H. Fawkes on the Consultative Committee of the College as showing the keen interest taken by the Admiralty in the scheme, and concluded his inaugural remarks by a few words of advice to the cadets. His counsel was that they should always be resolute and cheerful under all circumstances, and if they steered a steady course throughout, the chances were that they would achieve success in their career.

The tour of inspection was resumed after the speeches. It should be mentioned that the college was informally opened on September 1, 1917, for the purpose of receiving Royal Naval Reserve Cadets. There are now 37 boys undergoing training in the college, and the visitors were enabled to see the boys actually at work. The cadets are divided into two watches, the port watch and the starboard watch, and whilst the one watch was seen studying seamanship, signalling, &c., the other was seen at work in the class rooms.

The visitors were also conducted over the gun room, ward room, dormitories, sick room, &c. An interesting interlude was provided by "Exercise Fire Quarters," which showed the lads had already mastered the idea of smart movement, and other items in the programme included physical drill and gunnery squad drill, displays which left very little to be desired, having regard to the short time the lads had been under instruction.

The Nautical College has an exceptionally fine situation. An estate of over 100 acres on the top of a hill overlooking one of the most beautiful reaches of the Thames valley, and nearly 600 ft. above sea level, was acquired about a year ago. The main building which was erected for a private residence, has been adapted to receive the cadets. It is admirably equipped, and will accommodate 300 boys. Already noted, 37 boys are now undergoing training in the college, under the Captain-Superintendent of the college, Captain W. H. F. Montanaro, R.N. (retired).

We have already given a detailed account of the course of study to be followed by the cadets (see *Shipbuilding and Shipping Record*, May 17, 1917, page 484), but it may be of interest to recall that the boys are received into the college between the ages of 13½ and 15 years, and upon entry are enrolled as "Cadets, R.N.R."; they wear the regulation uniform.

The classrooms and seamanship room are built in accordance with the most modern principles, and the latter is used on Sunday for holding divine service, presided over by the Captain-Superintendent. Suitable arrangements have been made to meet the requirements of Roman Catholic cadets. The large dormitories, in which the boys' hammocks are slung over their sea-chests, are in all ways adapted for the purpose.

In addition to navigation and the other necessary subjects taught them in the classrooms by Mr. A. Hamilton Smith, who has made a speciality of preparing boys for the Navy, and Mr. W. I. Cooke, M.A., who was lately a mathematical master at Sedbergh School, the cadets are instructed by seamanship instructors who have been specially demobilised from the Navy in order to take up their duties at the college. The instructors also drill the cadets and teach boat-handling in service cutters on the Thames.

An excellent freehold property has been purchased on the bank of the river, which has been converted into an ideal dockyard for the housing of boats and their gear. Swimming is taught in a specially constructed bathing pool in the grounds of the college, whilst arrangements are being made for the erection close to the college of masts and yards, fitted with safety nets, in order that sail-drill may be regularly carried out under safe conditions.

The matron attached to the establishment has had long experience among boys; she presides over a very efficient domestic staff, including a nurse, who is in charge of the sick bay.

The educational course at the college occupies two years, each year being divided into two terms, with a short break of a fortnight at Easter. Upon leaving the college, the cadets will be drafted into foreign-going vessels. A year will thus be spent, during which time they will have every opportunity of putting into actual sea practice the theories they have acquired at the college.

It should be mentioned that the cost to the parent for board and education for these three years totals £210, viz.: £80 for each year spent at the college, and £50 for the following year at sea.

When the cadets have completed their year of service in the foreign-going vessels, they will be drafted into the Fleet for a further period of twelve months' training among officers of the Royal Navy. During this period they will receive pay.

It is of special interest to note the interest taken by the Admiralty in the scheme. Admiral Sir Wilmot Fawkes, G.C.B., has been appointed to represent the Admiralty on the Consultative Committee, and Sir Thomas Devitt was able to announce that the Admiralty had also offered a number of cadetships in the Royal Navy to cadets in the college, on the same basis as those offered to cadets in the *Conway*. The majority of the cadets, will, however, take their places in the merchant service under the blue ensign, and it should be noted that the Board of Trade have signified their approval of the scheme, and are considering the question of recognition of the time spent at the college for the purposes of the examinations for masters and mates.

In regard to the cadets who in the past have sailed under the house-flag of Messrs. Devitt & Moore, it is interesting to record that over half a year ago no fewer than 125 of these young men were serving their country, either afloat or ashore. As a matter of fact, at that time the number engaged in His Majesty's ships was 107, while 18 were serving in the Army. Since then the number had been considerably augmented, notably by the arrival home in this country of a number of cadets who were sent to England from the company's ocean training ship *Medway*, to join up in the R.N.R.

The illustration on page 495 shows Admiral Heath (centre) with Sir Thomas Devitt (right) and Captain Montanaro (left), inspecting a class in the flag room. An illustration of the college, together with portraits of Sir Thomas Devitt, Mr. Philip N. Devitt and Captain Montanaro, will be found in *S. & S.R.* of May 17, 1917.

EDUCATION OF ENGINEERS AND SHIPBUILDERS.

North-East Coast Draughtsmen's Views.

(*Continued from page* 464.)

Mr. Sloan, assistant manager of Armstrong, Whitworth's mercantile shipyard at Low Walker, who now has charge of the educational system of day classes, hoped that the proposals for improving education and ensuring efficiency, laid down in Mr. Hope's paper, might, by that Association, be so impressed on the minds of the principals of the industries affected that action would be taken to put such of them as commended themselves to these gentlemen into early operation for the benefit of themselves and their apprentices, and that the claim put forward in Mr. Heppell's paper for adequate recognition of the undoubted worth and status of competent, technically-trained draughtsmen might soon be universally conceded, to the mutual benefit of employer and employed.

It was surprising that, despite their educational handicap, the tradesmen of the engineering and shipbuilding industries had attained to such proficiency as craftsmen as to earn for Britain the distinction of being the premier shipbuilding nation of the world. It all pointed to the fact that our working men were by no means devoid of intelligence, but that must be further developed to enable them to maintain their position in the face of the challenge it was going to receive in the near future.

In Walker Shipyard an effort was being made to develop these resources with a view to future eventualities on very similar but less drastic lines than those suggested by Mr. Hope. All probationers between 14 and 16 years of age, and all apprentices from 16 were encouraged to attend the classes. No compulsion was exercised, but the advantages of attendance were laid before each lad in a personal interview. The session extended over 40 weeks, between September and June. The school premises, consisting of two large classrooms and a masters' room and complete lavatory accommodation, were provided by the firm, and the three masters, the furnishings, and all laboratory apparatus, were provided by the educational authorities. Exercise books, text books, drawing boards, T-squares, drawing paper and drawing instruments were provided free by the firm, but each student was charged a fee of 5s. by the education authorities for the school term of 40 weeks, and that sum was deducted by easy instalments from the lads' wages. The subjects taught were mathematics, physics, mechanics, suitable mechanical drawing and naval architecture. The work of the classes for boys between 14 and 16 years of age was of an elementary character suited to their capacity and included a course of English composition, which experience had shown to be essential. Marks were awarded for punctuality, conduct, classwork and homework, and an official examination was held at the end of the term in June. Bonuses were awarded as follows:—Sixpence per week for one year for obtaining a first-class pass by receiving 60 per cent. of marks in the examination and 60 per cent. of the aggregate of other marks obtainable; 4d. per week for one year for obtaining a second-class pass by receiving 35 and 35 per cent. marks respectively; and 2d. per week for attending the classes and sitting at the examination but failing to obtain 35 per cent. of the aggregate number of marks obtainable. These bonuses were paid on condition that the student attended the classes during the following session and were paid in a lump sum a year after they had been awarded. If, during the course of the class term of that year, a student's interest in the classwork or homework was allowed to wane, he forfeited the amount of the weekly bonus that would otherwise have been his until the work produced was restored to the required standard. Thus, the "lying-on" bonus served as an incentive to diligence on the part of the student and as a disciplinary instrument in the hands of the teachers. Each student attended on two occasions, each of three hours duration, per week.

There were at present 70 students in attendance, 42 juniors and 28 seniors. The junior section was divided—one-half meeting on two afternoons and the other half on one afternoon and Saturday morning from 9 till noon. The seniors all met as one class on two afternoons. The sub-division of the juniors prevented any serious dislocation of work by the withdrawal of all the younger lads at one time and ensured more satisfactory teaching. Each apprentice was thus withdrawn from work for six hours per week and was paid for these hours at "time" rates. In the senior section, one lecture was given per week on naval architecture to the shipwrights, platers and caulkers, on building construction to the joiners, and on machine construction to the fitters, blacksmiths and patternmakers. All students up to 16 in attendance at the classes might enter the competitive examination for apprenticeship in the drawing office, and any apprentice over 18, of general good conduct, who had done well at the classes and examinations and had shown some special aptitude for drawing, might be taken into the drawing office to finish his apprenticeship, should a suitable vacancy occur.

The aim of the scheme was not so much to make the lads clever as to make them useful. The scheme differed from that in operation at any other shipyard, so far as was known, but there was nothing revolutionary about it, and it allowed of the employment of boys for boys' work and avoided the inevitable dislocation that would occur were all boys under 16 withdrawn from shipyards and female or other labour substituted. It allowed the boys to earn wages as probationers from leaving school until indentured. During that period they moved about in the yard, became familiar with the features of the various trades and were in a better position to choose a trade for themselves than the lads of the future would be if the scheme under discussion or that recently adopted by the North-East Coast Institution, or that foreshadowed in the Government's Education Bill ever materialised, for then the lads would have to make their choice while at school, before entering either shipyard or engine works, thus incurring the risk of the misfits the suggested technical schools was devised to prevent. Instruction in the handicraft of the various trades, as proposed by Mr. Hope, was not attempted, as ample opportunity for the development of mechanical ability was afforded the apprentices under their respective foremen and alongside their fellow-craftsmen. The numerous difficulties encountered in 1915, in persuading apprentices to join the classes and resume and extend studies they had absolutely abandoned from three or four years previously, were now largely disappearing as the value of the training imparted was becoming more generally recognised. As the youths were now recognising that the object of the firm was really to stimulate them to be and to do their best for their own sakes, they were settling to work in right good will and, under the tactful and sympathetic tuition of the masters, were being imbued with right ideals as regarded the dignity of craftsmanship and the responsibilities of citizenship.

Mr. Percival Sharp, Director of Education for Newcastle, said that, unlike Mr. Sloan, he was very strongly in favour of the scheme outlined by Mr. Hope. He asked them to imagine a stream of something like 2,000 engineering apprentices pouring out of their junior technical schools after having received a thoroughly good training. They could not estimate the enormous difference that would be made in the morale of the engineering worker. He would go further than Mr. Hope, however. He thought that education must aim at more than educating mediocrity. Therefore, of the boys who were entering the engineering industry each year, he would take those who showed exceptional promise and send them to their apprenticeship for half-time and to a central technical college for half-time. He had made that suggestion to the North-East Coast Institution and, to his infinite surprise and gratification, the employers had accepted it, and were prepared to give the brightest of the engineering and shipbuilding boys the chance of half-time in the central technical college up to 18. To go further, when they had got the cream of the boys to the age of 18—the others carrying out their apprenticeship and having their eight or ten hours a

week he wanted the cream again and the best of these boys sent to the university, with a liberal maintenance allowance which would enable them to take up the engineering course of a college with any of the other students. He did not care what home the boy belonged to if his measurement was right—from the chin upwards. The North-East Coast Institution had agreed to that also, as had the Newcastle Education Committee. Therefore, they were, he thought, in a fair way to make some substantial step forward.

He was largely in agreement with Mr. Heppell. The abolition of examinations was not altogether a good thing and, also, that there was bound to be variation of standard where there was a large number of local examining bodies. He endorsed Mr. Heppell's suggestion that there should be a central body which should standardise the qualifications of draughtsmen and engineers and should raise the status of draughtsmen to that of being one of the liberal professions. He quite agreed that a draughtsman was a glorified architect—Mr. Heppell had not said it, but he meant it.

Mr. Eclair Heath, Principal of the Technical Department of Rutherford College, Newcastle, had no hesitation in saying that not only on Tyneside, but in the country as a whole, the material they had for technical education was very poor, because they had such huge classes. He did not think any Education Bill would be worth much which did not begin by fixing elementary day-school classes at not more than 30. He denounced evening classes as a pernicious system which should be swept away entirely and as one of the most fatal things ever done in the educational policy of this country. There ought to be far greater connection between the work and the technical instruction. If one could—as an engineer he should like to do it—carry all the classes out with the workshop and all that it meant at hand, that would be an ideal system, and similarly in the case of shipbuilding. For some time he had wanted to give instruction in engineering design. He wanted to put, on top of the work done in the principles of mechanics, mathematics and engineering science, some education that would enable a young man to carry out a design, say, of a large punching and shearing machine or a turbine. It was no use ending the instruction by asking questions as to what was the assumed direction of flow of steam through a turbine and what a turbine was like inside and outside. If the education ended there, the young man was not in a fit position to enter a drawing-office and take up the work. They wanted teachers for that class of work, and the teacher trained in the ordinary way was not capable of doing that work unless he had had many years in a drawing-office. It was open to those present to say, "We are prepared to find you teachers," and he could say, with Mr. Sharp present, that they were prepared to accept the services of such and to form the classes. He strongly agreed with their aspiration to endeavour to make themselves equal to a chartered institution. An engineer could have succeeded in any other profession.

The discussion was then adjourned until the next meeting, to take place on December 14.

Norwegian Owners and British Shipbuilders.—According to *The Times* the London correspondent of the *Aftenposten* (Christiania) interviewed Captain Hannevig on the subject of Norwegian orders for the construction of ships in British yards. Captain Hannevig, director of Hannevig's Bank, does not think that the British Government would prevent British shipbuilders from fulfilling such contracts, though they should naturally insist that Norwegian ships built in Great Britain should not be used for the profit of the enemy. At present, contracts have been made for the construction of [illegible] for Norwegian owners. The ships are mostly about 9,000 tons, and the contract price is £26 a ton for the larger and £30 a ton for the smaller, which are to be of better construction, and not of standard type. One-sixth of the purchase [illegible]

GERMAN YARDS DESIRE NO SUBSIDIES.

The War Commission of German shipyards has lost no time in issuing an official reply and protest (signed by Herm. Blohm, president, and Georg Howaldt, manager) to Prof. Laas' article on the Reconstruction Bill (*see S. & S.R.*, October 18, page 367). Laas laid great emphasis on the need for shipbuilding subsidies, but the counter-charge is now made that his views "find no sympathy amongst representatives of German shipbuilding and are calculated to give an entirely false impression as to the position, wishes and power of that industry in regard to reconstructing the mercantile marine."

The official communication agrees with Laas that orders for new vessels should be placed in Germany and a definite limit placed on tonnage purchased abroad, because:—(*a*) Purchases abroad would represent a loss to German shipbuilders and would further strengthen foreign competition, which is already strengthened beyond all anticipation. No consideration of temporary advantage can overrule this fundamental fact. (*b*) Inflated prices and unfavourable exchange would together place a prohibitive burden on the State if the scheme of subsidies were applied to new vessels ordered abroad. For instance, a simple cargo vessel of 6,000 tons cost £49,000 just before the war. It would now cost about £294,000, so that the Imperial grant (peace value *plus* 80 per cent. of excess cost) would amount to about £245,000, quite apart from the 50 per cent. difference in exchange on a Scandinavian purchase. Neither the price of finished vessels nor the level of exchange is likely to alter for some time.

So far the official representatives of the yards agree with Prof. Laas, but they go on to deny most emphatically that they need or desire Imperial subsidies to extend their yards and equipment. Existing yards have a selfish interest in opposing the foundation of new yards; but, apart from this, there are factors which militate against the prospects of any new yard being effective in the immediate problems of reconstruction or financially successful over a period of years. This is particularly the case in yards which are entirely new concerns without the support of association with established owners. Full output from new yards could be reached only in two or three years, when the principal demand might already be past. The high capital charges on any new concern established now would make improbable permanent financial stability. Finally, the establishment of new yards could only be accomplished by diverting the services of engineers and workmen just at a time when they might be employed far more usefully in developing the full output of existing yards.

The proposed statutory guarantee for full utilisation of yards is impracticable. All that can be asked is preferential supply of material for yard extensions, so far as permitted by war exigencies. Laas' statement that only 350,000 gross tons register (500,000 tons d.w.) of cargo vessels was built in German yards during each of the two last pre-war years cannot be denied, but a number of yards could have taken on many more orders, especially if they had suspended work on high-speed liners. In 1913, German yards employed barely 70,000 men, but they are now in a position fully to employ 100,000 men, and existing yards, together with extensions completed or in progress, could concentrate on cargo vessels, use standardised designs wherever possible and guarantee an output of 800,000 tons d.w. capacity per annum. The merchant fleet could be rebuilt by internal resources within a reasonable time, and all the Imperial assistance which can be spared should be devoted to shipowners, who have suffered very heavily.

Hamburg-Amerika Offices Seized.—A Reuter message from New York states that the offices of the Hamburg-Amerika Line have been seized on the orders of the Federal custodian of enemy property. Mr. Julius Meyer, the American manager of the line, and about 70 employees were ordered to leave the premises forthwith.

GENERAL NEWS SECTION.

PERSONAL.

Mrs. Chaddock, widow of Mr. Samuel Woolrich Chaddock, merchant, of Liverpool, has bequeathed a sum of £10,000, which she desired should be utilised for the founding of a Chair or Professorship of Commerce at the Liverpool University.

The Manchester Ship Canal Company have appointed Mr. George Hazlehurst to have control of both the general dock traffic and the railway traffic at the Manchester Docks, with Mr. A. Alcock as his chief assistant. Mr. Hazlehurst hitherto has been superintendent of dock traffic alone.

The death is officially announced of Captain R. Noel Mountfield, who before the war was employed in the general manager's department of the Mersey Docks and Harbour Board. Captain Mountfield joined up as a private, was given a commission in February, 1915, and was recently wounded in action.

Captain Robert Hoare, who died on November 19 in his sixty-fourth year, was an Acting Elder Brother of the Honourable Corporation of Trinity House, London. He was formerly a Commander in the Orient Line of steamers, and had been an Elder Brother of the Trinity House since June, 1899. He had represented Trinity House on the Harwich Harbour Conservancy Board since March, 1908.

The estate of the late Mr. Joseph Hoult, the well-known Liverpool shipowner, has been sworn at £330,713, "as far as can be at present ascertained." The deceased shipowner, it will be remembered, on attaining his seventieth year, gave £70,000 to Liverpool institutions and charities. In his will Mr. Hoult states: "I do not leave anything to public charities, having had the pleasure during my lifetime of meeting my inclinations in that respect."

The death occurred on November 19 of Mr. Peter Denny, at the age of 64 years. He was a partner in the firm of Denny & Co., shipbuilders and engineers, of Dumbarton, and also a director of the Irrawaddy Flotilla Company, Ltd. Outside of his professional work Mr. Denny identified himself with many interests in Dumbarton, and served for a number of years on the Town Council, and also on the Dumbarton County Council. He was the son of the late Dr. Peter Denny, the eminent shipbuilder.

Mr. James Carruthers, of Montreal, ex-President of the Montreal Board of Trade and President of the Canada Steamship Lines, has just offered to the British Government, through Lieut.-Colonel W. Grant Morden, the gift of four battleplanes for use on the Western front, and the Air Board in accepting the gift expressed its "warm appreciation of so generous a contribution." Mr. Carruthers had already presented three aeroplanes to the Canadian authorities and has given upwards of a quarter of a million dollars to Canadian patriotic funds.

Mr. John Isaacs Jacobs, senior partner in the firm of John I. Jacobs & Co., shipowners and brokers, Mark Lane, London, E.C., who died on August 18 last, at the age of 61 years, has left estate valued at £846,026, with net personalty of £841,645. Among other bequests he has left £5,000 to the executors for hospitals and Jewish institutions, including the Swansea Hospital, and such hospitals as they may select at Cork and Passage West, and the Home and Hospital for Jewish Incurables, and to pay not less than 100 guineas each to the Swansea Hospital, the Swansea Hebrew Congregation, and the Central Synagogue, Great Portland Street, London, W.

The death occurred on November 13, at Government House, Holyhead, of Rear-Admiral John Leslie Burr, C.M.G., M.V.O., King's Harbourmaster at Holyhead, at the age of 70 years. Rear-Admiral Burr, as Lieutenant of the *Argus*, served during the Ashanti War, 1873-4, being twice mentioned in dispatches and receiving the medal. In 1879, when in command of the *Pioneer*, he saw considerable service up the Oil Rivers, West Africa, taking his ship 700 miles up the Niger with Imperial and Colonial presents for the Emir of Nupi. In the same expedition he attacked and destroyed the town of Onitsha, settled disputes and re-opened trade. Admiral Burr was made C.M.G. in 1899 and M.V.O. in in 1904. He retired with the rank of Captain in 1905, and volunteered for further service on the outbreak of war.

On November 12 the death took place, at Glasgow, of Mr. John M. Paton, shipowner. Mr. Paton, who resided at Stafford, Busby, was a native of Beith, and about 60 years of age. He was well known in the coasting trade, first as a partner in the firm of Paton & Hendry and afterwards as the owner of a fleet of small coasting steamers. He was closely identified some years ago with the formation of the Coasting Motor Shipping Company, Ltd., of Glasgow, which was organised for the specific purpose of exploiting the internal-combustion engine for small marine powers. The company ordered a large number of vessels, ranging from 140 to 400 tons d.w., and at one time they had almost a score of them completed or on order. The craft were very successful in canal and short-distance cargo service, but the conditions created by the war brought about a large reduction of the fleet.

NATIONAL SHIPBUILDING YARDS.

It will be remembered that Sir Eric Geddes, in his recent statement to Parliament, announced that the Government found that it would be necessary to establish at least four national shipyards. During the past week many interesting questions have been asked in Parliament relative to these yards, the tenor of which we comment upon in our editorial columns, and the replies of Dr. Macnamara, the Parliamentary Secretary to the Admiralty, throw some interesting sidelights on the policy of the Government with regard to these yards.

On Wednesday last, in reply to Mr. G. Lambert, Dr. Macnamara said: "A large number of practical shipbuilders are at present in the service of the Admiralty, and are acting as advisers in carrying out the details of the Cabinet policy of establishing national yards. The names of the principal of these are:—Major J. W. Hamilton, chairman of W. Hamilton & Co., Ltd.; Lieut.-Col. J. Lithgow, senior partner of Russell & Co., director of Robert Duncan & Co., Ltd., and director of Napier & Millar, Ltd.; Mr. Noel E. Peck, director of Barclay, Curle & Co., Ltd., director of Swan, Hunter & Wigham Richardson, Ltd., vice-president of the Shipbuilding Employers' Federation, and chairman of the Clyde Shipbuilders' Association; Mr. W. Rowan Thomson, senior partner of David Rowan & Co., and chairman of North-West Engineers' Association; Major Maurice Denny, partner of W. Denny & Brothers, of Dumbarton; and Lieut.-Col. J. Mitchell Moncrieff, R.E., M.Inst.C.E., an eminent civil engineer experienced in the construction of shipyards and public works generally."

Further, in answer to Mr. Leif Jones, Dr. Macnamara added that estimates of the cost of the yards were in course of preparation.

Mr. Watt: Will these national shipyards be spread fairly over the Kingdom, so that each part will have its share?

Dr. Macnamara: They will be placed in the localities best suited to serve the interests of the country.

Mr. G. Terrell: Are these yards to be permanent, or merely temporary yards to meet the present emergency?

Dr. Macnamara: They will be, to some extent at any rate, permanent national yards.

On the following day the subject was again raised by Mr. G. Terrell, who questioned the steps that were being taken to ensure that existing yards were being utilised to their fullest capacity.

Dr. Macnamara, in reply, stated:—

"The construction of an additional 33 slips to existing shipyards has already been sanctioned, and further extensions are under consideration. It is estimated that an addition of from 50 to 60 slips will be made to existing private shipyards in all; and it is intended that the number of slips of the new national shipyards will be from 30 to 36.

"The necessity which led up to the construction of national shipyards is essentially bound up in the urgent requirements for merchant shipping consequent on the present war, and until this emergency is over the Government is unable to give any definite assurance as to the policy to be pursued in connection with these yards after the conclusion of hostilities. As regards the situation of the yards, sites for three of them have definitely been chosen at Chepstow, Beachley, and Portbury, and it is proposed to obtain the additional number of slips required by extending these yards if it is found possible. The construction of the first three yards mentioned is now in full progress. It is intended that slips will be available in the first yard for the laying down of keels in from three to four months, and that the first vessel will be launched in October or November, 1918."

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Clyde Shipyard Extension.—The scheme which Scott & Sons, Bowling, have in preparation for the extension of their shipyard appears now to be taking definite shape. It is announced that the firm have purchased a piece of ground to the east of their shipyard to be used as the site of a tidal basin and graving dock. A considerable development of both shipbuilding and ship-repairing at Bowling may be anticipated in the near future. The yard is conveniently situated almost midway between Glasgow and the Tail of the Bank, and at the western end of the Forth and Clyde Canal. A graving dock and tidal basin at this point should prove of great convenience for the repair and overhaul of medium-sized vessels.

Crinan Canal and Repairs.—The condition into which the Crinan Canal has fallen is giving rise to some concern on the part of those interested in the coasting trade on the west coast of Scotland. It has been pointed out to the Commissioners, who have control of the Canal, that there is a constant and increasing risk of a breakdown of the waterway, which may involve the closing of the Canal altogether. The Commissioners appear to be aware of this fact, as in their report for the year ended on April 30 last, it is admitted that extensive repairs will have to be carried out in the near future if the Canal is to be maintained even in its present condition. They also state that numerous representations have reached them as to the inadequacy of the Canal and the need for the construction of an improved and modernised canal in place of the present waterway. Representations have been made to the Treasury with a view to securing money for the necessary repairs, and it is stated that the Commissioners have obtained a loan of £7,500 for both the Crinan and Caledonian Canals.

Scotland and the National Shipyards.—From the answers given in the House of Commons last week by Dr. Macnamara, it would appear that none of the new national shipyards which the Admiralty propose to establish is to be situated in Scotland, although the reply was sufficiently vague to leave the matter still in doubt. At the same time it would appear that the majority of the advisers of the Admiralty on the subject are connected with Scottish shipbuilding. Dr. Macnamara said that their principal advisers, in carrying out the policy of establishing national shipyards were Mr. J. W. Hamilton, of William Hamilton & Co., Port-Glasgow; Lieut.-Colonel J. Lithgow, of Russell & Co. and Robert Duncan & Co., Port-Glasgow, and Napier & Miller, Old Kilpatrick; Mr. Noel E. Peck, of Barclay, Curle & Co., Glasgow, and Swan, Hunter [illegible] Richardson, Newcastle-on-Tyne; Mr. W. Bowan Thomson, of David Rowan & Co., Glasgow; Major Maurice Denny, of William Denny & Brothers, Dumbarton; and Lieut.-Colonel [illegible].

Effect of Bonus Order.—The Order issued recently by the Ministry of Munitions, granting a 12½ per cent. bonus to certain classes of skilled workers, including engineers, moulders, pattern-makers and others paid by time rates, has not had quite the effect which was expected in the removal of grievances and in the prevention of agitation at the present time. Its effect seems rather to have been to create new grievances and to multiply difficulties among those classes of workmen who have been left outside the scope of the Order. The object of the Ministry in issuing the Order appears to have been the laudable one of raising the pay of numbers of highly-skilled workers who had suffered—in comparison with others—as a result of the operation of the scheme for the dilution of labour. In not a few engineering shops, where a good deal of repetition work is being done, it frequently happened that men and women brought in under the dilution scheme were able to earn more than the highly skilled man, who, from the nature of his work, had to be kept on purely time rates. Had the Order been restricted to the removal of grievances of this kind little exception could have been taken to its operation. But its scope is wider, as it includes, among others, pattern-makers and moulders, trades in which there has been little, if any, dilution. The general effect of the Order, therefore, has been to inspire a movement among practically all classes of workers for a further increase of wages to meet the high cost of living.

SCOTTISH EAST COAST DISTRICT.

(From Our Own Correspondent.)

Aberdeen Harbour Commissioners.—The election of commissioners to Aberdeen Harbour Board has resulted in the following appointments being made:—Sir John H. Irvin, shipowner; Mr. John Ellis, shipowner; Mr. Walter G. Jameson, shipowner, and Mr. Alexander Wilson, granite merchant. It may be noted that at the present time Sir John H. Irvin is a prisoner of war in Germany.

Shipbuilding at Kinghorn.—It is expected that a start will shortly be made with the construction of ships at Kinghorn. As announced some time ago, the old shipyard at Kinghorn was taken over by a new company, of which Mr. John Fletcher, of the Montrose Shipbuilding Company, is the managing director. The work of reconstructing the yard is now in progress, and large quantities of building material and plant have been brought to the site. The largest building berth in the yard is being extended with a view to laying down larger vessels than were formerly built there. It is understood that the new company have a number of orders on some of which work will be started at an early date.

Trade at Leith Docks.—At a recent meeting of the Edinburgh Chamber of Commerce, Mr. John Herdman, one of the representatives of the Chamber on Leith Dock Commission, gave a satisfactory report of the work of the Commission during the year. In dealing with the second full year's working under war conditions, he said that though the final result was considerably behind that of the previous year it might nevertheless be considered as satisfactory, when they took into account the extraordinary abnormal conditions under which the trade and commerce of the country had to be carried on. The total revenue was £178,000, against £172,000, and constituted a record in the history of the harbour and docks. Unfortunately, they had also to deal with a record ordinary expenditure, amounting to £168,000. The net surplus for the year was only £21,004, as compared with £21,589 in the previous year.

NORTH-EAST COAST DISTRICT.

(From Our Own Correspondent.)

Unloading of Iron Ore.—There has been accelerated despatch on the Tyne in respect of the unloading of iron ore ships, but the turn-round of vessels still leaves something to be desired when compared, say, with the results achieved on the Clyde. Last week representatives of Government departments concerned with the handling of shipping visited North East Coast ports and had conferences with receivers of ore, stevedores and others, interested in the consignments arriving from the Mediterranean and Spanish ports.

Engine-room Staffs.—The altered conditions at sea, due to the war, have directed attention to the subject of the staffing of the engine-room on board ship. Mr. F. Pounder, the West Hartlepool secretary of the Marine Engineers' Association, in a communication to his society, points out that instant attention to orders transmitted from the bridge is essential if all that can be done is to be done, but this is not always possible when one man has to fulfil the multifarious duties of keeping watch alone. A simple expedient in the better class of boats is, he points out, to carry greasers, and thus allow the

[illegible] expense in carrying two or three greasers is as nothing if their services [illegible] the ship and her crew.

The Standard Ships.—By arrangement with the Ministry of Shipping, officials of the Marine Engineers' Association have had an opportunity of inspecting the accommodation on the first of the 8,000 tons d.w. standard ships, and they seem to have been well satisfied with the internal arrangements. Matters of detail concerned with the furnishings needed attention, we learn, but otherwise the accommodation on these "Government-owned" vessels is regarded as highly satisfactory, and a great advance on vessels of a similar size built previously.

Trade of the Tyne.—Sir William H. Stephenson, who is now in his 82nd year, has been re-elected chairman of the Tyne Improvement Commission, of which authority he has been a member for the long period of 39 years. He has been chairman seventeen years. In returning thanks for the continued confidence reposed in him, Sir William briefly touched upon the river trade of the past year, a year that had been most strenuous and eventful. As a result of war conditions imports had fallen off, and there had also been a considerable diminution in the exports. This had caused the Commission to increase the river and dock dues up to 50 per cent., and he expressed satisfaction that the people with whom they had business had generously acceded to the request. The larger revenue would, he said, be a considerable factor in their financial calculations in the ensuing year.

On Friday a meeting, arranged by the Ministry of Munitions was held at the offices of B. J. Sutherland & Co., Ltd., Newcastle, the local agents for the Director of Munitions' Overseas Transport. Mr. C. W. Murray, of the Overseas Transport Department, pointed out that on the Tyne the average rate of discharge of iron ore ships in the second half of 1916 was 484 tons per ship per day, but thanks to increasing efforts at acceleration, the rate of discharge had increased to a maximum of 974 tons in September this year. During four of the past six months, however, the average rate of discharge of ore steamers at Glasgow exceeded 1,000 tons per ship per day, a maximum of 1,228 tons per ship per day having been reached in June. More time, he said, was lost on the Tyne by steamers waiting to commence discharging, than at any other port, due apparently to a shortage of suitable ore discharging berths. Those with local knowledge know that this is the crux of the difficulty. At the meeting there was a long discussion on many important points, and it was agreed to make a journey down the river to survey, on the spot, what possibilities there are for speeding-up the discharging of the ore ships.

Boycott of Germans.—The Merchant Seamen's League had a very successful meeting at Newcastle to protest against the methods of warfare adopted by the Germans and to advocate a boycott after the war. The speakers included Captain Davidson and Mr. E. Cathery and Mr. J. Havelock-Wilson, of the Sailors' and Firemen's Union, the latter of whom said his union had not arrived at a decision in regard to the boycott, and that it would not fail for want of trying. They would not sail with a German, and no British ship would go to Germany. This was everybody's version from the captain to the cabin-boy. If neutrals brought German cargoes the Dockers' Union would not handle them.

One can quite understand the bitter feeling which the brave men of our mercantile marine entertain for the piratical methods of the Germans. They [illegible] have been. With the following expression of opinion, culled from the current *Journal of the Marine Engineers' Association*, many more persons than the seafarers will be in hearty sympathy:—"We are amongst those who would like to see a lasting peace established by Christmas, but it must be of the kind which would prevent a recurrence of the horrible crimes which have been perpetrated by our enemies on the civilised peoples of the earth. For the enemy there is no code of honour at sea; for them there is no such sentiment as the chivalrous [illegible] ships without warning, but have sacrificed the lives of thousands of our brave seamen who were civilians, ruthlessly and needlessly."

Wages and Increases. [illegible] unity in the ranks of labour, but when a sharp test comes to be made the cohesion is sometimes more apparent than real. Regarding the application to the engineering and shipbuilding employers for [illegible] Steam Engine Makers' Society, in its latest report, has a tilt at the unskilled trades for the action they took at the conference. It is recorded with regret "that in spite of the fact that an overwhelming majority of the federated trades agreed upon a cent. per cent. advance on pre-war rates being asked for, and at which the labourers' unions were represented and took part in the discussion, and where it was definitely understood that if they were not willing to agree to such joint application, each case should be heard separately and apart, yet when before the Committee on Production, and although forming part of the allied movement, they made a separate application based upon a ten shillings per week increase, &c., and put up four speakers in the place of the two mutually agreed upon—'more solidarity'—and, in a word, our case was smothered by seven speakers and fourteen speeches." "Solidarity" apart, most disinterested people will agree, I think, that the most common-sense claim of the two was that of the labourers, who aimed at something less than the moon.

Many workers whose earnings are little more than they were in pre-war times—I refer to the salaried classes rather than the larger body designated wage-earners—and who are manfully bearing the burden of the higher cost of living without any demonstration of discontent, must sometimes wonder why there should be so much talk about labour unrest, particularly in the well-paid industries like engineering and shipbuilding. The demands for increases in wages are recurrent in the latter trades, as in most of the other big industries, the shipyard trades unions having recently asked for an advance of a hundred per cent. on pre-war rates of pay, but wages agitations do not apparently account for all the prevailing unrest. The monthly report of the Steam Engine Makers' Society, a union that is not given to saying extravagant things, alleges that not a little of the responsibility for the present unrest lies at the door of the "official bureaucrafts," who, it is asserted, "have little, if any, experience such as befits them for the difficult problems they have to tackle from time to time, and it is rife and rampant in all Government departments dealing with labour and its conditions." In view of a statement like this, one is curious to know what has become of the assistance of the numerous trade union officials who have entered Government departments to help and advise in the problems referred to.

MERSEY DISTRICT.

[illegible]

Dockside Carters' Wages.—It is to the credit of the Mersey dockside carters that though their month's notice in respect of an advance of 13s. a week in wages asked for expired on Saturday, they decided at a mass meeting on Sunday to continue at work, pending arbitration on the question which is to take place in London this week.

Government Control of Trade.—The precise attitude of the Liverpool Chamber of Commerce on the question of the Government control of trade after the war, to which I referred last week, is set forth in the following resolution which has since been passed by the General Trades Committee of the Chamber: "That this meeting protests against the promotion by the Government of any Bill in Parliament designed to extend to a period after the war the vexatious restrictions of trade now in operation, until the commercial community has first had full opportunity to consider its terms."

Mersey Docks and Harbour. [illegible] the annual election of the Mersey Docks and Harbour Board comes round again, and the six retiring members, who are all eligible for re-election, are Messrs. Alfred H. Read, H. B. G. Warren and W. J. Chambers, representing the shipping interest; Mr. H. R. Rathbone, the corn trade; Mr. A. W. Willmer, the cotton trade; and Mr. J. H. Burrell, the timber trade. In all probability these gentlemen will be nominated again by their respective trade associations, on December 12, and though there has been some complaints lately of lack of enterprise on the part of the Docks Board in not providing the port with [illegible] to put [illegible] grievance on the cold storage question to decide otherwise, if they think fit, to [illegible] they may be no more successful than the forwarding agents were many years ago, when they forced a contest, they may succeed in getting an authoritative statement from the Board as to what cold storage accommodation is to be provided in the near future. What

I have heard remarked in this connection is that the dock electors are kept as much in the dark in regard to matters of dock administration as the country is in regard to the war.

SOUTH WALES DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Coaltrimmers and Pooling of Labour.—The result of the ballot of the members on the question of the pooling of labour shows that an overwhelming portion of the men are against the scheme. With a view of mitigating the effects of unemployment among the members of the Union it has been decided that every ship being loaded shall be fully manned in accordance with the manning scale, and that no man shall be allowed to work more than 12 hours in one turn.

Question of Increased Shipping Dues.—At a meeting of the Newport Harbour Board reference was made to the fact that nearly all the Northern Conservancy Boards had decided to raise their dues in consequence of the stress of the war, and it was thought that the Newport Board should do the same. The clerk was instructed to obtain information on the matter, when it will be considered in connection with the dues payable to the Alexandra Docks Company.

Large Fusion Scheme.—It is announced that arrangements have been completed for the fusion of the interests of Wm. Cory & Son, Ltd., and Mann, George & Co., Ltd. Wm. Cory & Son, whose head office is in London, are the well-known firm of coal and coke factors, contractors, steamship owners and lightermen, having branch offices at Cardiff, Newcastle-on-Tyne, Hull, Goole, Erith, Gravesend and Rochester. Mann, George & Co., Ltd., carry on a most extensive business as bunkering contractors. Their head office is also in London, but they have branches at Cardiff, Newport (Mon.), Newcastle-on-Tyne and Glasgow.

New National Shipyards.—Keen interest is displayed in shipping circles in the Bristol Channel in regard to the site of the fourth national shipyard. It is understood that a site at Cardiff has been offered, while the claims of the advantages of deep water and railway connections at Newport have been put forward. The Swansea Harbour Trustees have appointed a deputation to wait on the authorities and put before them the desirability of considering the claims of Swansea, and as regards Port Talbot, the new Development Committee are to put forward the facilities that could be offered at that port, such as large steelworks and other necessary requirements for a shipbuilding yard.

Docks on Neath River.—Mr. G. Conway Williams, representing the Neath Harbour Commissioners, attended a council meeting at Neath to ask for support for the construction of a bridge over the Neath river. He pointed out that the bridge would develop a very considerable amount of land on the river bank. Plans had been prepared for making docks on the river, and owing to the lack of such a bridge the district had lost two large shipbuilding yards within the last 10 years. The Anglo-Persian Oil Company having taken 300 acres of land in the vicinity was another reason for action. When this industry was established it would give employment to 3,000 people. The Council asked for further details and the estimated cost of the scheme before taking any action.

Wages Advanced at Welsh Ports.—The Committee on Production on Thursday last issued their award in respect of applications for advances in wages made to the Engineers and Shipbuilders Employers Association (Cardiff, Newport, Barry and Penarth districts) on behalf of certain sections of their employees. A claim was submitted on behalf of the men for a 100 per cent. increase above pre-war rates. The award states that the men concerned, age 18 and over, shall receive 5s. a full ordinary week, while 2s. 6d. is to be paid to those under 18 years. Boys and youths and apprentices on attaining the age of 18 shall receive the further advance of 2s. 6d. The advances are to be paid as from the beginning of the first full pay in December. In the case of piecework workers, premium bonus workers, and other men working on payment by results, the amount is to be paid by the firms at the rate of 5s. per full ordinary week over and above the week's earnings of the men concerned, calculated on the present basis. The amounts awarded are to be taken into account in the calculation of payment for overtime or night duty, or for work on Sundays or holidays, but they are not otherwise to apply to or affect the present time rates, premium bonus rates, or piecework prices, and are not to be taken into account as part of time rates for the purpose of fixing new piecework prices or premium bonus rates.

Pooling of Coal Export Business.—The scheme adopted by various coal exporting firms at Cardiff for the pooling of business in connection with the shipment of coal to Italy is not having all the support which was expected. It will be recalled that the new arrangement was to take effect from November 1, 1916, that it was to cover all shipments beyond the quantity specified for the immediate service of the Italian authorities, and that it would remain operative for the duration of the limitation scheme. One of the points of contention is in regard to the retrospective application of the agreement. This involves, it is stated, the question of the voluntary return from individual firms of an amount of between £35,000 and £40,000. The difficulties of the scheme are great, but the firms working on the side of the pool are considerable, and are determined that it shall take effect in some form, if not in that determined upon a few weeks ago. At Swansea a pooling scheme for the French trade has been adopted, which will become operative as and from January 1, 1918.

Question of Brokerage on Freights.—An interesting question has cropped up in Cardiff coal and shipping circles over this matter. In the letter from the Board of Trade accompanying the Controller's Direction as to the sale of coal issued on June 28 last it was stated that in the case of shipments to France and Italy, the then existing arrangements as regards the question of brokerage on freights should continue, but that in case of shipments to other destinations outside the United Kingdom the amount of brokerage to be retained by the exporter shall not exceed 6d. per ton, the balance being payable to the collieries from which the coals were shipped. It appears that some of the colliery companies are claiming that everything over 6d. should now be refunded to them in respect of coals shipped under contracts, and a controversy has arisen as to whether this claim is valid in view of the direction that all contracts entered into before May 1, 1917, were not to be interfered with. Exporters contend that they are protected by this provision, but the colliery companies reply that that particular provision applies only to the contract prices of coal, and it will probably require the ruling either of the Controller or of a court of law before the point is decided. The amount involved may be very considerable, for freights have varied from about 100s. in the case of Gibraltar to 190s. and more in the case of Italian ports, and a third of 5 per cent. on a Gibraltar freight represents 1s. 8d. per ton—*i.e.*, 6d. to the exporter and 1s. 2d. to the colliery. Many side issues are raised, and it will be interesting to see how the point will be settled.

BELFAST DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Tidal Turning Basin.—Another important work is the construction of a tidal turning basin, partly on the site of the present timber ponds on the Co. Antrim side of the harbour. This pond will be 213 yards long and 200 yards wide. Two docks will also be built convenient to this basin, which will communicate with the existing Millwater Basin by an entrance 27 ft. wide, spanned by a lifting bridge. Provision is also sought for the new quays adjoining Spencer Basin and Dufferin Dock, and at the Abercorn Basin and the Clarendon Dock.

Improvements in Musgrove Channel.—The Musgrove Channel is to be further developed by the construction of a jetty quay 188 yards long, commencing at its south-west end near the Hamilton Road, and adjacent to Harland & Wolff's premises. Five wharves are also to be built in the channel, all of which, save one, will be 133 yards long, the fifth being 100 yards long. The channel itself will be widened and deepened, as will also the turning basin on its eastern side. It is also intended to erect a jetty quay on the east side of the present fitting-out basin, adjoining the Thompson Wharf and running parallel with it. This quay will be 467 yards long and will accommodate the largest liners.

The Victoria Channel will also be deepened from a point south-west of the Lighthouse on the East Twin Island for over miles seaward. Plans of all the projected works have been prepared and will be deposited in the Naval official quarters in the course of a few days.

New Works involving £2,000,000.—The Harbour Commissioners of Belfast, taking time by the forelock, have decided to

promote an omnibus bill in Parliament which will involve the construction of new works, estimated to cost £2,000,000. It is not intended that all the works shall be gone on with immediately, but none the less the Commissioners are determined to be able to deal with post-war conditions. It is well known that important shipbuilding developments are contemplated by private enterprise, particulars of which will shortly be available. The Commissioners' projected works are designed to cover both the shipbuilding and the shipping industries, and when completed will make Belfast, already a fine port, one of the best equipped ports in the United Kingdom. There are many clauses in the proposed Bill dealing with finance, rates, stock, powers of sale and other matters into which we do not propose to enter at this stage. A summary of the projected works will, however, be of interest. Broadly speaking, it is proposed to follow the existing lines by developing the shipping end on the Co. Antrim side, and the shipbuilding end on the Co. Down side, where the greater part of the existing yards and shops are already located. In connection with the shipbuilding, power is sought to build a graving dock 324 lineal yards long, with an entrance 37 yards in width, close to the south end of the Thompson Wharf and the north-east corner of Workman, Clark & Co.'s premises on the Queen's Road. It is proposed to make a new cut, or channel, for navigation, commencing by a junction with Victoria Channel on its north-west side, 866 yards north-east of the north-east end of the west Twin Island, extending therefrom one mile, two furlongs and 190 yards. This channel will be 83 lineal yards wide between the bottom of its side slopes, increasing to a width of 700 yards, where it will unite with Victoria Channel. This channel, at its south-west end, will terminate 96 yards from a point on the top of Thompson's Embankment, 166 yards from the south-east end of the Northern Road.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.—Very little change is apparent in the freight markets on the Baltic Exchange. Rates remain high and are stiffly held, especially from the East. Heavy grain from the Northern Range is also commanding big figures. Homeward from the River Plate there is no change, the market being nominal on the basis of 145s. from the up river ports and 140s. for down river loading. From the ports of the North American Atlantic sea-board the inquiry is very good for tonnage on net form of charter. To the United Kingdom 230s. is obtainable, to France 260s. and to Italy 360s. For Gulf loading an advance on these figures of 30s. may be had. For heavy grain 45s. could probably be got by neutral tonnage to France, and 40s. to the U. K. Coal cargoes from Virginia to the Plate are worth quite 125s. or to Rio de Janeiro 32 dols. Sugar could be worked Cuba to French Bay ports at 290s. or 300s. From the East there is still keen competition for available tonnage which continues in very short supply, and no doubt advances would be conceded on the rates quoted. Karachi to the U.K. on such basis is worth fully 250s. and Bombay to this country on d.w. would come at 250s. to 275s., or 400s. to the Mediterranean. From the Madras Coast to Marseilles kernels are worth 550s. The rice ports are bidding up to 600s. which figure would be paid from Burma or Saigon to France or this country. To Santos from Calcutta on jute basis the rate is 550s. In the Mediterranean section of the market tonnage is being taken up from the ore and phosphate ports at good figures. From Huelva to the Mersey the basis is still 45s., Bilbao to Boulogne 50 fcs., Bougie to the Clyde 50s., and Tunis to the same destination 65s., and Sfax to Bordeaux 80 fcs. In the Bay trade rates are indicated by fixtures at 22s. 6d. Bordeaux to Bristol Channel, and 24s. Bayonne to Bristol Channel. There is considerable inquiry for neutral steamers on time charter and 40s. to 60s., according to size, can readily be obtained for twelve months' trading.

Glasgow.—A very restricted supply of tonnage was responsible for the quietness which has prevailed on the Glasgow market since our last report. A large business could be done in outward freights were tonnage available. Homeward chartering continued slow from the coast, and the following items. Fixtures were reported as follows:—Bordeaux, 2,000; Bristol Channel, 22s. 6d., prompt; Bayonne, 2,000; Bristol Channel, 24s., prompt; New York, 2,500, River Plate, 825, net form, prompt; New York, 2,700; Liverpool, 230s., net form prompt. Time charters: States and West Indies, 3,000, 32s. 6d., one round trip, delivery and re-delivery north of Hatteras; States and West Coast of South America, 4,200, 40s., one round trip, delivery New York, re-delivery north of Hatteras. Sailing vessel: New York to Australia, 3,500, lump sum about £22,000, general cargo.

Newcastle-upon-Tyne.—The shipping shortage has been maintained during the past week in all its recent rigour, so far as the offerings of "free" tonnage are concerned, but this week opened with a rather larger number of requisitioned vessels for the carriage of coal and coke on official account coming to hand, a circumstance which, obviously, is of great benefit to the local coal trade. Collieries, therefore, are working with a much greater degree of regularity than was the case a week ago, and prospects of employment for the remainder of the week are good. Business done in the open chartering market, however, is lamentably small. Vessels have been taken up for London discharge at the rather higher rate of 21s. Swedish figures, too, are harder. Gothenburg having been done at from 190 kr. to 192½ kr., as against from 185 kr. to 190 kr. last week, and Stockholm at 200 kr., as against from 195 kr. to 200 kr. Chartering from the Spanish Atlantic ports is idle and the rate of 160s. to Bilbao or Santander is still quoted. For Portugal there is nothing doing, but Lisbon remains listed at 95s., and Oporto at 105s. Gibraltar is steady at 100s. No fresh fixtures from the Spanish Mediterranean are reported for Tyne loading, but locally a 2,000-ton vessel has been engaged for Glasgow loading to Barcelona at the amazingly high rate of 300s. For French Atlantic ports with coal and/or coke very few fixtures are reported, but the demand is keen and the full maximum rates are on offer.

Liverpool.—Outward freights maintain a very firm tone, but little business can be done owing to extreme scarcity of boats. Time chartering is also slow for the same reason, though the fixtures made in the American trades indicate easier rates. States to West Indies has paid 32s. 6d., and States to West Coast of South America, 40s., in both cases for a round trip. Homeward freights are firm all round. Eastern markets being neglected, £50 per ton is being offered for beans to Cette from Vladivostock, and £45 per ton for copra to Spain from the Philippines. Bombay quotes 400s. d.w. to Mediterranean, and 600s. Burma or Saigon to United Kingdom or France. America maintains an active inquiry for general cargo at fuel rates, while grain is also very firm on basis of 40s. to United Kingdom. Other markets are quiet and unchanged.

Cardiff and Swansea.—The market has been without any quotable change, business being practically confined to Allied destinations at limitation rates. A fair amount of tonnage was available for the requirements of the authorities and for allocation. The only transactions made public, however, were Brest, twice, at 45s. (neutral); Fécamp, 48s. 9d. (neutral); St. Nazaire, 30s. (allied); Nantes (Newport loading), 61s. 6d. (neutral). The Mediterranean was represented by Gibraltar, 100s., and 160s. was paid for a neutral steamer for Algiers. On the Swansea market a brisk inquiry has been in evidence, rates being firmly upheld for all unscheduled ports, but actual chartering continues of small dimensions. The following fixtures were reported:—Guernsey, 42s.; St. Servan, 43s. 6d. (neutral); Caen at 46s. 6d. and 48s. (neutral); Havre, 22s. 6d. (allied); La Pallice, 51s. 6d. (neutral); and Burry Port to Guernsey, 42s.

COMPANY REPORTS AND DIVIDENDS.

Ebbw Vale Steel, Iron & Coal Company, Ltd. The directors have declared an interim dividend of 6 per cent. per annum on the preference shares for the half-year to September 30 last, less tax. Warrants will be payable on December 11.

Schlesische Dampfer Company-Berliner Lloyd.—This amalgamated concern has suffered severely by the unfavourable condition of the Oder. Matters have improved during the last few weeks, and much depends on the remaining months of the year. Up to the present there is little prospect of realising any dividend. Last year 6 per cent. was paid.

Sylter Dampfschiffahrts Gesell A.G., Westerland.—The long standing project for through connection between the two island railways has been accomplished by the Hamburg-Amerika line (Seebaderdienst). A working and joint interest agreement has been reached between the latter and the Sylter company. Owing to the hard winter and the continuance of the war, the company is still [illegible] difficulties, but results were rather better [illegible] year. After paying off the 1915-1916 deficit (£25) there remained a surplus of £366 from which £148 was deducted for depreciation in securities. A dividend of 5 per cent. was paid from the net gain, and a reserve which now stands at £855.

[illegible] Steamship Company, Ltd. The managing owners [illegible] their circular letter containing [illegible] Oriental Steam Navigation Company and the British India Steam Navigation Company, Ltd., for the purchase of shares in this company, have informed the shareholders that they have already received authority from the holders of upwards of 85 per cent. of the issued shares in the company [illegible]

Stettiner Oderwerke A.G., &c., Stettin.—The share capital [illegible] The [illegible] profit for the past financial year was £62,100 (£42,400 last year); depreciation, £12,900 (£6,080); net profit, £25,100 (£14,150); dividend, 10 per cent. (8 per cent. last year). The turnover was £252,500 (£184,000). The considerable increase in depreciation allowance is due chiefly [illegible] to maintenance and repairs.

[illegible] Mackinnon. From a net surplus of £138,000 (£69,400 in 1915-16) there has been paid a dividend of 25 per cent. for 1916-17 (compared with 30 per cent. last year). The share capital is £116,000 and the reserves now amount to £92,500. The directors report that the difficulties of working increase progressively. The supply of imported steel practically ceased about the end of 1916, so that work on new vessels had to be suspended. Large stocks of steel then in hand permitted repair work to be continued, but this will not be the case much longer, unless fresh supplies can be obtained. Conversion of the machine equipment to electric driving (with current supply from the Nordsjaellands Electricity & Railway Company) evades the difficulty of obtaining fuel supplies. The future appears to offer many grave problems, amongst them the heavy expenditure involved by the contemplated extensions and renewals in the yard.

[illegible] Shipping Company, Ltd. During the half-year ended June 30 last there was a net profit of £14,068, or £9,440 less than in the same period of 1916. From the December half of last year a balance of £18,600 was brought forward, making the total at credit £32,669. Out of this the directors decided to pay a dividend at the rate of 10 per cent. per annum on the ordinary shares and 6 per cent. on the preference shares. These appropriations absorbed £13,530. The remainder has been carried forward, raising the aggregate to £19,139. The total of the company's balance sheet is £550,955; liabilities, including capital, £281,000; insurance and reserve funds, £33,826; depreciation account, &c., £140,606; and sundry creditors, £62,854. Steamship, freeholds &c., are grouped at £335,157; wharf plant is valued at £2,379; investments are shown at £85,493; coal stores, &c., at £17,657; engineering stock, £12,243; sundry debtors, £70,962; and cash, £27,064. In their report the directors state that the [illegible] from mishap, coupled with a large volume of trade in the other branches of the company's business, have enabled them, in spite [illegible]

COMPANY REGISTRATIONS.

Bush Steamship Company, Ltd. Capital, £30,000, in £1 shares. Objects: Owners and managers of steamships, &c. Signatories:—

[illegible]

The Campbeltown Shipbuilding Company, Ltd.—Capital, £60,000, in £10 shares. Objects, to take over the business of the Campbeltown Shipbuilding Company. Signatories:—

[illegible]

Registered office, Trench Point, Campbeltown. Private company.

Scarisbrick Steam Trawlers (Fleetwood), Ltd. Capital, [illegible] Signatories:—

[illegible]

Freeland Shipping Company, Ltd.—Capital, £50,000, in £1 shares. Objects, to purchase, contract for, charter, hire, build or otherwise acquire, own and work steam and other ships or vessels, &c. Signatories:—

J. E. [illegible], Cotton Exchange Buildings, Liverpool, Shipowner.
H. T. Shaw, Oriel Chambers, 14, Water Street, Liverpool, marine insurance broker.

J. W. Fisher & Co. are the first managers. Solicitors: W. Glasgow, 1, Water Street, Liverpool. Private company.

Neville Foundry Company, Ltd.—Capital, £2,000, in £1 shares. Objects, iron, copper, brass, aluminium and metal founders, steel makers and converters, smelters, manufacturers of and dealers in castings, shafting, pumping sets, cables, buoys, tanks, lifts, cranes, lifting blocks, gauges, pulleys, belts, wind screens, &c. Signatories:—

J. [illegible], Rotherham, Wheelwright.
G. [illegible], Rotherham, Steel Founder.

The first directors are: J. Hawkins and G. Rawlings. Registered office: Nevjlle Street, Rotherham. Private company.

Jonemann's Transport Company, Ltd.—Capital, £800, in £1 shares. Objects: Carriers, haulage contractors, railway and forwarding agents, collectors, shipowners, freight contractors, lightermen, warehousemen, wharfingers, general traders, &c. Signatories:—

[illegible], Paris (Partner in R. Jonemann et Fils, [illegible] Importers of the French Army.
Gaston Kloubert, 37, Glenloch Road, Hampstead, N.W., clerk.

The first directors are: Bernard Gaston Jonemann and Gaston Georges Kloubert (managing director). Private company.

Doonglen Steamship Co., Ltd. Capital £9,900, in £1 shares. Objects: Shipowners, charterers, and builders, ship, insurance and loading brokers, freight contractors, carriers, wharfingers, &c. Signatories:—

[illegible]
S. W. Oakley, Braeside, Epsom, shipowner.

The first directors are S. W. Oakley (chairman), E. H. Sollas, and P. Baay (all of whom are permanent). Registered offices: 52, Gracechurch Street, E.C.4. Private company.

Russian Utilities & Construction Company, Ltd.—Capital, £5,000, in £1 shares. Objects: To investigate and examine public works of all kinds, including railways, docks, harbours, piers, wharves, embankments, &c. Signatories:—

W. Shearer, 66, Queen Street, E.C. (Director of Balfour, Beatty & Co., Ltd.).
[illegible], [illegible], Ltd.

The first directors are to be appointed by the subscribers. Registered office: 66, Queen Street, E.C. Private company.

Frost Ferro-Concrete Company, Ltd.—Capital, £1,200, in £1 shares. Objects, designers and builders of and dealers in ships, tugs, barges, beams, blocks, slabs, &c. Agreement with P. B. Frost. Signatories:—

[illegible]
W. Mountcastle, 234, Selsoal Road, Crookes, Sheffield, traveller.

The first directors are: P. B. Frost, S. Barratt, C. Croxford and W. Mountcastle. Solicitor: J. E. Wing, 70, Queen Street, Sheffield. Private company.

McBain Bros., Ltd. Capital £5,000, in £1 shares. Objects: [illegible] reclamation and [illegible] fisheries, dealers, [illegible] Articles: [illegible] Secretary. A. G. Greaves. Solicitor: E. L. Bates, 20, Collingwood Street, [illegible]

Wessex Aircraft and Shipbuilding Company, Ltd.—Capital, [illegible] Manufacturers of aerial [illegible] shipbuilders, submarine builders, ship and barge owners, dredgers, salvage agents, carriers by land, air or sea, mechanical and electrical engineers, &c. Signatories:

[illegible]

The first directors are to be appointed by the subscribers. Solicitors: [illegible], Chancery Lane, E.C. Private company.

THE SILVER WAR BADGE.

The Secretary of the Admiralty announces that under the provisions of the Military Service (Review of Exceptions) Act, 1917, the following amended conditions for the award of the Silver War badge have been approved for His Majesty's Naval Forces :—

The badge will be granted, subject to the approval of the Admiralty, to the following who have served in the Naval Forces since August 4, 1914 :—

(*a*) Those whose services have been terminated, after service at sea or abroad, on account of wounds or physical infirmity for which they were not themselves responsible.

(*b*) Subject to their being over military age (as defined in the Military Service Acts) or certified as permanently and totally unfit under the Review of Exceptions Act, those whose services have been terminated :—

(1) After service at home only, on account of medical unfitness for which they were not themselves responsible.

(2) After service at sea, abroad or at home, on account of age, or other cause not within their own control.

As hitherto, the award will include officers and men of the Royal Navy, Royal Marines, and Naval Forces of the Dominions, Royal Fleet Reserve, Royal Naval Reserve, Royal Naval Volunteer Reserve and Royal Naval Auxiliary Sick Berth Reserve ; officers and men of the mercantile marine serving under special naval engagements in H.M. ships and auxiliaries ; members of Queen Alexandra's Royal Naval Nursing Service and Reserve ; officiating ministers, civilian medical practitioners and dental surgeons who have given whole-time service.

Applications for the badge should be made as follows : Royal Indian Marine, to the Under Secretary of State, India Office, S.W.1 ; Dominion Naval Forces, to the High Commissioner for the Dominion concerned ; all other Naval Services, to the Accountant-General of the Navy (Medal Branch), Admiralty, S.W.1.

NORTH-EAST COAST INSTITUTION OF ENGINEERS AND SHIPBUILDERS.

The balloting list for the officials of the Institution for the ensuing session—in addition to those who, elected earlier, retain their positions—is as follows :—

President : Edwin L. Orde, local director of Sir W. G. Armstrong, Whitworth & Co., Ltd.

Vice-presidents (three required) : John T. Batey, general manager, Hawthorn, Leslie & Co., Ltd., Hebburn ; Jas. Marr, chairman, Sir Jas. Laing & Sons, Ltd., shipbuilders, Sunderland ; David Myles, manager, N.-E. Marine Engineering Company, Ltd., Wallsend ; Geo. Renwick, shipowner, Newcastle ; and R. L. Weighton, M.A., D.Sc., Professor of Engineering, Armstrong College, Newcastle.

Ordinary Members of Council from Members' Section (four required) : Geo. Ainsworth, general manager, Consett Iron Company, Ltd. ; Wm. N. Bartram, shipbuilder, Sunderland ; T. C. Billetop, director, Henry Watson & Sons, Ltd., Newcastle ; C. Waldie Cairns, superintendent engineer, Newcastle ; E. Hall-Brown, manager, Richardsons, Westgarth & Co., Ltd., Middlesbrough ; G. M. Harroway, director, Sir Raylton Dixon & Co., Ltd., Middlesbro' ; Col. D. R. MacDonald, shipyard manager, Sir W. G. Armstrong, Whitworth & Co., Ltd., Walker Shipyard ; A. B. C. Parsons, B.A., engineer, C. A. Parsons & Co., Ltd., Heaton, Newcastle ; A. C. Ross, managing director, Hawthorn, Leslie & Co., Ltd., Newcastle ; G. D. Weir, manager, N.-E. Marine Engineering Company, Ltd., Sunderland ; and H. G. Williams, M.Inst.C.E., naval architect, Sir W. G. Armstrong, Whitworth & Co., Ltd., Newcastle.

[illegible] castle.

Hon. Treasurer : R. H. Winstanley, secretary, Swan, Hunter & Wigham Richardson, Ltd., Neptune Works, Walker.

It is competent for members, associate members and associates, to substitute other names for the foregoing. The ballot closes on November 28.

The session's first general meeting is to be held on Friday, November 30, when [illegible] address from the new president, is expected. Those who have promised to contribute [illegible] Dr. Adamson, M. [illegible] on January 25 next ; Mr. Henry Allingham, who will deal with "Scientific Management" on February 22 next ; and Mr. C. Waldie Cairns who, on a date not yet fixed, will address the members on "Some Unconsidered Details of Ship Equipment and Construction."

NEWS PARAGRAPHS.

Prize Money.—A Bill to regulate the distribution of the prize money which has been earned by the Navy during the war will probably be introduced in Parliament next Session. The proceeds have been paid into a pool.

The Fourth National Shipyard.—The Admiralty has promised to send engineers to inspect sites offered for the fourth national shipyard on the Bristol Channel. These offers come from Cardiff, Newport, Swansea and other places.

Wear Commissioners' Dock Scheme.—The River Wear Commissioners have given notice of their intention to apply to Parliament for powers to enlarge their existing No. 1 Graving Dock at the South Docks, and are also asking for power to lease the enlarged dock to T. W. Greenwell & Co., ship repairers, &c., of Sunderland. The plans show that the enlarged dock will be capable of accommodating a very large type of vessel and will provide repairing facilities, the need of which at the port has been recognised for a very long time.

Thermit Welding Process.—The Board of Trade have given formal sanction to a new company, known as the British Barimar-Thermit Welding Company, Ltd., to take up and exploit the Thermit welding process which, before the war, was exclusively in German hands. Thermit is specially applicable for tramway welding and the repair of heavy castings and machine parts. It is the intention of Mr. C. W. Brett, managing director of Barimar, Ltd., scientific welding engineers, to train disabled British soldiers and sailors to carry on the work. The offices of the new company are at 10, Poland Street, London, W.1.

Shipbuilding at East Boothbay.—The Atlantic Coast Company, successors to the Old Townsend Marine Railway & Construction Company at East Boothbay, is planning to do an extensive business in shipbuilding during the coming winter, their present plans contemplating the launching of five large schooners before the early summer of 1918. It is reported that the first to be launched, probably about the middle of this month, will be named *Anna Laura McKenney*, after the wife of Mr. William A. McKenney, of Boston, a large stockholder in the new company. The keel of the second schooner has already been laid, and a third one will be stretched very shortly.

Twenty-four Hour Day in United States Shipyards.—It is reported from Washington that the United States Shipping Board is endeavouring to get 24 hours' service a day out of all shipyards, so as to facilitate the construction of their great building programme, and all interests involved have been asked to co-operate. If this can be done, it is estimated that the amount of tonnage which will be turned out between now and March 1, 1918, will be materially increased. Some of the shipyards have been working on a single eight-hour shift, but the men in charge of the programme are determined that that condition must be corrected immediately. Organised labour has been asked to lend its best efforts to obtain the workmen necessary for two, and, if possible, three such shifts a day.

Housing Jarrow Workmen. To overcome to some extent the lack of housing accommodation in the district, Palmers Shipbuilding and Iron Company, Ltd., is erecting at Hebburn a large hostel and canteen for the use of the workmen at the Jarrow shipyard and iron and steel works, and the employees at the Hebburn yard, the site being about equi-distant from the Jarrow and Hebburn [illegible] for workmen in separate rooms, and each room will be well furnished and warmed. There will be three blocks, each three storeys high. Each block will have sitting and recreation rooms, lavatories, &c. Arrangements have been made for drying rooms for men's clothing, and it is also intended to erect an up-to-date laundry. The canteen will have accommodation for 800 men, in order to provide not only for the workmen resident, but for those non-resident. Well-cooked hot food will be supplied at low charges. The rental to be charged for the rooms in the hostel will be 5s., 4s. 6d. and 4s. per week, respectively, for the three floors. It is expected that a portion of the [illegible] completed

during the summer. In addition, the Palmer Company has built and leased some 75 houses at Hebburn for the use of their workmen.

Norwegian Boycott of Germans.—An Exchange message from Copenhagen says that at a meeting convened by the Norwegian Union of Ships' Mates a resolution was adopted protesting against the German treatment of the sailors of the Norwegian mercantile marine and deciding to boycott all Germans and German ships and to refuse to discharge the cargoes of German ships in Norwegian ports.

Coal-Shipping Combine Rumours.—Reports have been prevalent on the Cardiff Coal and Shipping Exchange associating the Cambrian Combine and Furness, Withy & Co. in a joint enterprise. No confirmation, however, has been forthcoming, although the fact must not be overlooked that Furness, Withy & Co. have recently been credited with the intention of entering the coal export trade on a greatly extended scale after the war.

Requisition of American Steamships.—According to the New York *Journal of Commerce* the United States Shipping Board has given notice to all owners of ships registered and enrolled under the laws of the United States that the requisition of all American steamships as described below would become operative and effective as from October 15. The ships affected by the said requisition and included therein are (*a*) all cargo ships able to carry not less than 2,500 tons d.w., including bunkers, water, and stores; and (*b*) all passenger steamships of not less than 2,500 tons gross register.

Foremen Engineers' Wages.—The Ministry of Munitions, in a communication to the London Association of Foremen Engineers, state that with regard to the 12½ per cent. bonus awarded to time workers under the Skilled Time Workers (Engineers and Moulders) Wages Order, 1917, the department would be prepared to consider an advance to foremen and draughtsmen in receipt of emoluments not exceeding £250 per annum, provided they are not in receipt of a bonus on output, and proposals which have been agreed between employers and employees with regard to this should be submitted to the Ministry for consideration.

Increase in Meat Freights.—Sharp increases in the freights on frozen and chilled meat are, it is understood, to come into operation shortly. In 1915 all the insulated space was requisitioned by the Government, at freights which represented an increase of only ¼d. a lb. or less as compared with the pre-war level. Now, it is understood, the Ministry of Shipping feels compelled to raise the rates of hire to the Board of Trade, by whom the insulated space was requisitioned. The new rates are estimated to represent an advance in the rates from Australia, New Zealand, and South America of about 1d. a lb., making the total freight about 2d. a lb.

Irish Shipbuilding Developments.—The Queenstown Urban District Council have brought under the notice of firms engaged in ship repairs, &c., having yards at Queenstown, Cork and Passage West, a communication issued from the Department of the Deputy Controller for Auxiliary Shipbuilding, asking for the names of companies who would undertake the construction of certain specially named small vessels. Three local firms have given authority to the Council to put forward their names. It is stated on reliable authority, that Furness, Withy & Co., Ltd., of Liverpool and West Hartlepool, who have purchased the Rushbrooke Dock premises at Queenstown, have decided to carry out extensive improvements, which will involve a very large expenditure of money. The civil body at Queenstown has promised to erect several hundred up-to-date houses for the additional workmen to be employed at the docks.

Skilled Time Workers and the 12½ per cent. Bonus. The following announcement signed on behalf of the Trade Union Advisory Committee by Mr. Frank Smith (Shipbuilding Group), Mr. Wm. F. Dawtry (Engineering Group) and Mr. J. N. Bell (Lesser Skilled Group), was issued last week:—Further discussions have taken place between the Ministry of Munitions with other Government Departments interested, and the Trade Union Advisory Committee, with regard to the request of semi-skilled and unskilled [illegible] for the extension to them of the 12½ per cent. bonus. Recent events in the conduct of the war have made it impossible for the Government to deal with the question as quickly as was desired by the men's representatives, but they have every reason to feel satisfied with the conduct of the negotiations. The whole matter is to be submitted to the War Cabinet, whose decision is hoped for in a few [illegible] all workmen concerned to [illegible]

Purchase of Glasgow Engineering Works.—We are notified that Russell & Co., Port Glasgow, have purchased the engineering works of David Rowan & Co., of Glasgow.

Belgian Chamber of Commerce in Brazil.—A Belgian Chamber of Commerce has recently been established at Rio Janeiro, for the purpose of collecting and exchanging commercial information for the benefit of Belgian merchants and commercial institutions and for the furtherance of Belgian economic interests in Brazil and Brazilian commerce in Belgium.

Unsinkable Ships.—According to the Washington correspondent of the Associated Press the United States Shipping Board has approved the building of twenty 4,000-ton unsinkable ships in the United States to the order of the French Government. The unsinkable ships developed by French experts are said to have withstood a torpedo attack in a test in which four shots were fired at the hull, the only effect being to destroy the cargo in the area where the explosion occurred.

Concrete Vessel Costs.—A company was lately founded in Christiania to operate three concrete motor ships, each of 350 tons d.w. capacity. The vessels measure 123½ × 23½ × 13 ft., and will each have a 160 h.p. Bolinder motor. The average cost of the completed vessels is £41 10s. per ton, *i.e.*, £14,500 each, made up as follows: Hull, £6,490; motor, £4,700; fittings, &c., £2,950; plus 10 per cent. profit to the builders. The hulls are to be floating and delivered in March next, under a penalty of £5 10s. per vessel per day.

German Vessels in America.—According to *Shipping*, of the 103 German vessels with a total tonnage of 611,799 deadweight tons seized by the United States Government, all of these except 20, with a tonnage of 120,500 tons, have been repaired and are now in the service of the Army and Navy, or the Allied Governments. The remaining 20 are still in process of repair and will be similarly employed when the work upon them is completed. In addition, 14 Austrian interned ships have been acquired for the use of the United States and Allies. Their tonnage aggregates 88,505 tons.

Motor Boats on Belgian Coast.—It is officially stated that the electrically controlled motor boats used on the Belgian coast are twin petrol-engined vessels, partially closed in, and travel at a high speed. They carry a drum with between 30 and 50 miles of insulated single core cable, through which the boat is controlled electrically. The fore part carries a considerable charge of high explosive, probably from 300 to 500 lbs. in weight. The method of operating is to start the engine after which the crew leave the boat. A seaplane, protected by a strong fighting patrol, then accompanies the vessel at a distance of 3 to 5 miles and signals to the shore operator the helm to give the vessel. These signals need only be starboard, port or steady. The boat is zigzagged while running. On being steered into a ship the charge is exploded automatically. This may be either intentional or unintentional. The device is a very old one. A boat similarly controlled was used in H.M.S. *Vernon* (the torpedo experimental ship) as far back as 1885. The only new features in the German boats are petrol engines and wireless telegraph signals, neither of which existed then.

The National Shipyards.—A long series of questions arising out of the decision of the Government to construct national shipyards was put in the House of Commons on Tuesday, November 20. Dr. Macnamara, Secretary to the Admiralty, stated that it was not the intention to construct shops for the manufacture of the engines and equipment. "From what source," asked Mr. G. Terrell, does the Admiralty propose to obtain the necessary engines?" "From the existing engineering shops as a whole," replied Dr. Macnamara. Another question concerned the labour supplies for the new yards. Dr. Macnamara said that no skilled managers or draughtsmen would be taken from existing shipyards without the consent of the shipbuilders with whom they were employed. When he was asked who the Government had in view as skilled managers to work these yards the hon. gentleman replied that they would be the head of the Department of National Service—Sir Lynden Macassey and General Collard. They would work with an advisory committee. Some questions were asked as to the employment of ships constructed in the Government yards, when the war was concluded. Were they to be in competition with privately-owned ships? Sir L. Chiozza [illegible] said that the question was under consideration.

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"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and Type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year	Machinery and builders.	Remarks.
Border Knight, ss.	3,724 gr. 2,394 net 6,180 d.w.	360′ × 46′ × 25½′ (23′ 4″)	Borderdale Shipping Co., Glasgow, to the Ellerman Lines, Ltd., London	D. & W. Henderson & Co., Glasgow (1899)	24, 40, 64 × 42 (D. & W. Henderson & Co.)	
Borderer, ss. (spar dk.)	4,372 gr. 2,835 net 7,200 d.w.	374½′ × 48½′ × 19½′ (24′ 7″)	Borderdale Shipping Co., Glasgow, to the Ellerman Lines, Ltd., London	Russell & Co., Pt. Glasgow (1904)	26, 42, 70 × 45 (Clyde S.B. & E. Co., Pt. Glasgow)	Price about £250,000.
Hermiston, ss. (spar dk.)	4,389 gr. 2,831 net 7,100 d.w.	374½′ × 48′ × 27½′ (24′ 9″)	Borderdale Shipping Co., Glasgow, to the Ellerman Lines, Ltd., London	R. Duncan & Co., Pt. Glasgow (1901)	26½, 42, 70 × 48 (D. Rowan & Co., Glasgow)	
Ferro, ss. (single dk.) (ex *Falkanger*, ex *Brynhild*, ex *Hirundo*)	2,153 gr. 1,340 net	290′ × 42′ × 20½′	Skibs. Akties. Astoria, Christiania, to Dampskibs. Akties. Grefsen, Christiania	Wood, Skinner & Co., Newcastle (1899)	21½, 35½, 58 × 39 (N.E. Mar. Eng. Co., Newcastle)	Price about 3,600,000 kr.
Follo, ss. (single dk.) (ex *Asmund*, ex *Tramp*, ex *Skarp*, ex *Jeanne A.*, ex *Saint Donats*)	1,536 gr. 934 net	261′ × 35½′ × 20½′ (18′ 11″)	Skibs. Akties. Astoria, Christiania, to Dampskibs. Akties. Grefsen, Christiania	Schlesinger, Davis & Co., Newcastle (1881)	20, 32½, 53 × 36 (N.E. Mar. Eng. Co., Sunderland)	Price about 2,000,000 kr.
Grelcora, ss. (single dk.) (ex *Banchory*)	2,189 gr. 1,317 net 3,750 d.w.	287′ × 44′ × 19′ (18′ 5″)	Haenton Shipping Co., Cardiff, to Globe Shipping Co., Cardiff	Craig, Taylor & Co., Stockton (1914)	21, 35, 57 × 39 (N.E. Mar. Eng. Co., Sunderland)	Price about £72,500.
J. Manchester Haynes, s.v.	796 gr. 683 net	179½′ × 35½′ × 20½′	Rogers & Webb, Boston, Mass, to buyers not stated	L. Storer, Waldobro', Me. (1885)	—	—
Maisie, ss. (single dk.)	4,425 gr. 2,763 net	385′ × 52′ × 25′ (23′ 8″)	A. Laming & Co., London, to Harris & Dixon, Ltd., London	Bartram & Sons, Sunderland (1911)	26, 43, 71 × 48 (J. Dickinson & Sons, Sunderland)	—
Poldhu, ss. (single dk.)	2,793 gr. 1,791 net	319½′ × 46′ × 21′ (20′)	Poldhu SS. Co., St. Ives, to buyers not stated	J. Blumer & Co., Sunderland (1902)	23, 38, 62 × 42 (J. Dickinson & Sons, Sunderland)	Price about £62,500.
Polurrian, ss. (single dk.)	2,801 gr. 1,807 net	319½′ × 46′ × 21′ (20′)	The Polurrian SS. Co., St. Ives, to buyers not stated	J. Blumer & Co., Sunderland (1900)	23, 38, 62 × 42 (J. Dickinson & Sons, Sunderland)	Price about £56,000.
Storli, ss. (well dk.) (ex *Gelda*, ex *Lionidas and Eleni*, ex *Aldersgate*)	2,140 gr. 1,382 net	289½′ × 39′ × 21′ (21′ 5″)	Ellingsen & Johannessen, Bergen, to Dampskibs. Aktics. Grefsen, Christiania	C. S. Swan & Hunter, Newcastle (1889)	22½, 36½, 60 × 39 (Blair & Co., Stockton)	Price about 3,150,000 kr.
Vittoria, ss. (single dk.)	2,817 gr. 1,768 net 4,800 d.w.	317½′ × 46½′ × 20½′ (20′)	Century Shipping Co., London, to buyers not stated	Richardson, Duck & Co., Stockton (1907)	23, 38, 62½ × 42 (Blair & Co., Stockton)	—

PORT NOTES.

Paranagua.—Port works to be undertaken include the opening of two channels, one 2,000 metres long, 300 metres wide, and 8 metres deep at low tide, and the other 3,600 metres long, 300 metres wide and 8 metres deep, and the construction of a wharf 550 metres long. Extensive dredging, paving and drainage works, rail connections, warehouse construction and electrical installations are included in the project. The works are to be commenced within a period of three years from the date of the registration of the contract by the Tribunal of Accounts and must be concluded within a further five years. The full text of the Decrees (in Portuguese) relating to these improvements may be consulted by British firms interested at the Department of Commercial Intelligence, 73, Basinghall Street, London, E.C. 2.

Carlskrona.—Traffic before the war amounted to between 400,000 and 500,000 net tons per annum, but the harbour was only accessible for vessels up to 19½ ft. The channel is to be deepened to admit vessels drawing 23 ft., and the equipment of the port is to be modernised so that a full share can be obtained of the expected boom in Swedish overseas trade after the war. A large harbour site is to be enclosed. Expenditure on the first portion of the extension scheme will amount to £93,000.

SHIPPING SHARE MARKET.

There has again been considerable activity in the shipping share market, and most securities have either risen in value very substantially or are in such short supply that existing quotations do not represent the actual dealing price. Among the most notable advances is that of Clan Line £10 shares, which have advanced no less than 12 points during the past fortnight, rising from 31½ to 42, over 16 bargains being recorded at between 41 and 42 on Friday last on the London Stock Exchange. Business reported from the provincial exchanges is on the same lines. It was freely rumoured that the company was negotiating the sale of its business, but an official denial was promptly issued. "No such sale or amalgamation is under consideration, nor is it in any way contemplated." Despite this denial, business has continued brisk at the higher figure. Indo-China Deferred has also continued to advance in price from 29½ to 32, on persistent buying, for reasons which we referred to last week. King Line shares have also been favoured by buyers, and the price has risen to 41s., which is the record figure. Last year's dividend and bonus was 15 per cent., and the market is apparently looking for a repetition of this distribution when the turn of the year comes. It is known that the company has sold one of its steamers at a very high profit, and that its financial position is exceptionally strong. It is officially notified on the market that the P. & O. offer to the Hain Steamship shareholders has been accepted by over 85 per cent. of the shareholders. The advance has not been confined to the smaller-priced shares as Royal Mail Steam Packet ordinary have been in demand at the ex-dividend price, and dealings have taken place at over 113. In the shipbuilding section there has been equal activity, the demand for shares in the lower-priced companies being too great for the supply, and many brokers had to carry over orders for execution at the week-end. Swan Hunters have now touched their record price at 47s. 6d., and the demand for the shares is still persistent. Palmers Shipbuilding issues are also being forced higher by the steady demand. In dry dock shares there is also activity, but there are few sellers in the market. The past week's business probably exceeds in bulk any previous week of the present year.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING.

Name.	Share and paid.	Extreme quotations, 1916.	Last ann. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
African S.S.	20	33—23½	10	6½	29	
Allan Line ... ... Deb.	100	—	4	4½	92	
Anchor Line ... Cum. pref.	10	9¾—9¼	5½	5½	9½	
Do. ... ... Deb.	Stk.	105¾—102⅞	4⅜	4¼	103	
Argentine Nav. ... Cum. pref.	1	1⅜/6—11/-	Nil.	Nil.	23/3	— -/1½
Do. ... ... Ord.	1	1⅜/6—5/6	Nil.	Nil.	17/3	
Australasian Un. S. Navy. Deb.	Stk.	83¾—80¾	4	5	80	
Belfast Steam ... ... "A"	10 (5pd.)	—	5	5	5	
British & African Nav. ... Deb.	Stk.	96¾—91	4½	4¾	102	
British India Nav. ... Deb.	Stk.	94¾—88¾	4½	5⅛	83⅞	
British S.S. Invest. Trust Def.	Stk.	357—190	30*	8½	355	
Do. ... ... Pref.	Stk.	108—105⅜	6	5⅞	104	
Do. ... ... Deb.	Stk.	79—77¾	4⅜	6 7/16	74	
Cairn Line ... ... Deb.	Bds.	99—88	5	5⅜	90½—91	
Do. ... ... Ord.	1	—	20†	9½	44 4½xd	
Clan Line ... ... Ord.	10	32¼—22½	25	8⅝	44½	+5½
Court Line ... ... Ord.	£1	42/—20/-	20	13⅛	39/3	— -/4½
Cunard SS. ... ... Ord.	1	101/—68/-	20*	5½	79/-	—1/9
Do. ... Cum. pref.	Stk.	95—89	5	5⅛	85	
Do. ... ... Deb.	Stk.	99¾—93¾	4⅜	4⅝	99⅝	
Elder Line ... ... Deb.	Stk.	97¾—89¾	4⅜	4⅝	103	
Elder Dempster ... Cum. pref.	1	20/6—18/1⅜	5⅝	6½	18/6	
Do. ... ... Deb.	Stk.	92⅛—88⅜	5	5⅜	87	
Ellerman Lines ... Pref. Ord.	10	9¹⁵⁄₁₆—9¼	6⅜	6¾	9⅛	
Do. ... Guar. pref.	10	9⅞—9⅜	4⅞	5⅛	9⅞	
France Fenwick ... Cum. pref.	8	98⅜—92/6	5⅜	6¼	87/6	
Furness, Withy	1	61/3—34/3	20*	9¾	33/6	— -/3
Do. ... Cum. pref.	10	9¼—7⅞	5	5⅞	8½	
General Steam Nav. ... Ord.	7½	12⅜—8⅜	15	7½	22/6	
Do. ... ... Pref.	8	7⅞—6⅜	6	7⅜	16/-	
Houlder Line ... Cum. pref.	5	83/9—67/6	5⅜	6¼	80/-	
Do. ... ... Deb.	Stk.	—	4⅜	4⅞	93	
Houlder Bros. ... Cum. pref.	5	—	5⅜	6¼	4	
Do. ... ... Deb.	Stk.	—	4⅜	5⅛	82	
India Gen. Nav. & Rly. ... Ord.	10	12—8¾	6	5⅞	10⅜	
Indo-China N. ... Pref. Ord.	5	5⅞—9⅜	5	6¼	9⅜	
Irrawaddy Flotilla	40	—	15	5⅛	116	
Khedivial Mail ... ... Ord.	1	37/—10/-	25	13½	38/-	+ -/9
Do. ... ... Pref.	5	77/6—60/6	5⅜	7⅛	72/6	
Do. ... ... Deb.	Stk.	94¾—87¼	4⅜	4¾	95	
King Line	1	41/—9/-	16*	9¾	41/6	+1/9
Lamport & Holt ... Cum. pref.	£1	20/9—18/9	6	6	19/4½	
Leyland (F.) ... Cum. pref.	10	8⅛—6½	5	6⅜	7⅞	
Mercantile SS. ... ... Ord.	5	18½—12	40	13	21⅜	+1½
Do. ... ... Pref.	1	20/1⅜—20/-	5	6¼	15/-	
Moor Line ... ... Ord.	10	—	30	13½	22½	
Nelson Steam Nav. ... Deb.	100	98¾—97⅛	5	5⅛	98⅜	
New Zealand ... ... Ord.	£10	—	8	5⅜	32¼	
Do. ... ... Deb.	Stk.	90⅞—88	4	4½	89	
Nitrate Producers SS. ... Ord.	5	25⅛—18	30	6½	25	
Do. ... Cum. pref.	5	—	5	5	5	
Oceanic Steam. Nav. ... Deb.	100	99—95⅛	4⅜	4⅝	96	
Orient. Stm. Nav. Co. Cum. pref.	10	9¾—9⅛	5	5½	9	
Do. ... ... Deb.	100	98—91⅞	4⅜	5⅛	88¼	— ⅜
P. & O. S. N. ... Cum. pref.	100	100—91	5	5⅝	93	+ ½
Do. ... ... Def.	100	349—270	18	5½	329½	—1⅜
Do. ... ... Deb.	Stk.	71—69	3½	5⅛	63⅝	
Prince Line	1	95/—26/-	30*	7½	98/1⅜	— ⅜
R.M.S.P. ... ... Ord.	100	134¾—97¼	7	6½	113	
Do. ... ... Pref.	Stk.	89¾—76⅜	5	6¼	81⅜	
Do. ... ... Deb.	Stk.	89—86	4⅜	5⅛	86	
Shaw, Savill & Alb. Cum. pref.	5	95/—86/3	5⅜	5⅝	85/-	
Shell Transport ... ... Ord.	1	6—4⅜	35	7½	5⅜	
Do. ... Cum. pref.	10	10⅛—9	5	5½	9	
Sutherland SS. Co.	£1	69/6—41/6	30	10	51/3	
Union-Castle SS. Cum. pref.	10	7⅛—7	4⅜	6	7⅛	+ ⅛
Do. ... ... Deb.	Stk.	92⅜—86¾	4	4⅝	87⅛	
West Hartlepool ... ... Pref.	10	8¼—7⅜	5⅜	7⅛	7⅝	

INSURANCE.

Alliance	20 (2/4 pd.)	10⅛—8⅜	12/-	7	9⅛	
Indem. Mutual Marine	15 (3 pd.)	13⅜—9⅛	15/-	5	20⅜	
London Assurance	25 (12½ pd.)	52½—42½	20	6	58½	+ ¾
Marine Insurance	25 (15 pd.)	36⅜—33⅜	45/-	6	55⅝	
Merchants' Marine Insurance ...	10 (2/6 pd.)	7⅛—71/3	10	6	9⅜	
N. British & Mercantile Ord.	25 (6¼ pd.)	34⅜—29	40/-	6¾	34⅜	
Phœnix Assurance	10 (1 pd.)	7¼—6¾	40	7	7¼	+ ⅛
Reliance Marine	10 (2 pd.)	—	20	4½	7¾	
Royal Exchange Assurance ...	Stk.	189½—181	10	5½	230½	
Sea Insurance	10 (2 pd.)	19⅜—19⅛	10	6	27⅛	+ ⅛
World Marine, Limited ...	5 (2 pd.)	61/3—35/-	5	4¾	6¾	

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1916.	Last ann. div. or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
Babcock & Wilcox... ... Ord.	1	64/6-47/10½	15	4⅝	66/3	+4/9
Baldwins ... ... Cum. pref.	1	1⅛—1	5½	5⅝	19/9	
Do. ... ... Deb.	Stk.	87⅝—86½	4½	5⅛	84	
Bayliss, Jones ... Cum. pref.	1	—	5	7½	1 1/16	
Bell Bros. ... ... Cum. pref.	10	10⅜—9⅜	8	6½	9½	
Do. ... ... Deb.	Stk.	80—78⅝	5	6⅜	75⅝	
Bessemer (Henry) ... Ord.	1	29/—26/-	12½	8⅜	29/9	
Bolckow Vaughan ... Ord.	1	25/10½—18/-	11	8	28/6	+1/6
Do. ... ... Cum. pref.	20	18—18	5	5⅝	17	
Cargo Fleet Iron ... ... Ord.	1	23/3-13/10½	3	3⅛	24/1⅜	+1/1½
Do. ... ... Deb.	100	86½—84	4½	5⅜	83	
Consett Iron Co. ... ... Ord.	1	89/4½—65/3	50	11⅛	89/6	
Dominion Iron & Steel	Bds.	83—78	5	6½	76	
Dorman, Long ... ... Ord.	1	36/—22/3	14	9	45/9	+1/3
Do. ... ... Deb.	Stk.	97½—97	4	5⅛	73	
Ebbw Vale Steel & Iron ... Ord.	1	28/7½—19/-	12½	9⅜	28/6	+ -/6
Guest, Keen & Nettefids ... Ord.	1	71/3—60/-	15*	5⅜	87/-	+ 2/6
Do. ... ... Cum. pref.	5	5½—5½	5	4⅜	5⅜	
Do. ... ... Deb.	Stk.	82½—80½	4	5⅛	79	
Hadfield's Steel Foundry ... Ord.	1	82/6—69/-	30	6	100/6	
Ibbotson Bros.	5 (4 pd.)	8—6	1½	4⅜	6¼	
Jessop (W.) & Sons ... ... Ord.	5 (4 pd.)	9—8	15*	7½	9	
Lanarkshire Steel ... Cum. pref.	10	—	5	7⅛	7	
Lysaght (J.) ... ... Cum. pref.	1	22/7⅛—20/3	6	6	20/-	
Do. ... ... 2nd pref.	1	21/1⅛—21/-	6	6	20/-	
Manganese Bronze ... ... Ord.	1	—	6	11	1⅛	
Do. ... ... Cum. pref.	1	—	6	8	9⅛	
North-Eastern Steel ... ... Deb.	Stk.	—	4½	—	—	
Palmers Ship & Iron "A" ...	1	12/6—9/-	Nil.	Nil.	10/9	
Scott (Walter) ... ... Ord.	1	26/3—17/9	15	12	25/-	
Do. ... ... Pref.	1	16/10⅜—16/3	6	7⅜	19/-	
Sheffield Forge ... ... Ord.	1	—	15	7½	69/-	
Shelton Iron & Steel ... Ord.	1	20/4½—15/-	7½	8⅛	23/10½	+2/4½
Do. ... ... Deb.	100	94—92⅜	5	5⅜	91⅜	
S. Durham Steel & Iron ... Ord.	1	37/6—27/-	14	10	41/-	+ -/9
Do. ... ... Cum. pref.	1	21/—19/-	6	6½	20/-	
Do. ... ... Deb.	Stk.	82—80	4½	5⅝	80	
Steel Co. of Scotland ... Ord.	10	—	10	10	12/1/-	
Stewarts & Lloyds ... Pref. ord.	10	18½—17	10	6½	16	
Do. ... ... Cum. pref.	10	—	6	4⅛	13½	
Stone (J.) ... ... Cum. pref.	10	—	5	6¼	8	
United States Steel	100$	144⅜—83⅛	7	7⅜	107¼†	
Do. ... ... Cum. pref.	100$	128⅝—112¼	7	5⅞	118¼†	
Vickers Ltd. ... ... Ord.	1	40/3—33/6	12½	6½	39/1⅜	— -/5¼
Do. ... ... Pref.	Stk.	93—85	5	6	81	
Do. ... ... Deb.	Stk.	83—75	4	5⅓	79	
Weardale Steel ... Def. ord.	1	31/— 19/1⅛	19½	13⅛	30/9	+ -/3
Do. ... ... Cum. pref.	1	23/6—17/6	6	5	23/-	—1/-
Do. ... ... Deb.	Stk.	70⅛—69¼	4	6	63	
Workington Iron & Steel Ord.	1	24/3—14/3	10	7½	28/6	+1/1½

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Armstrong, Whitworth ... Ord.	1	43/—34/6	12½	7	41/-	+1/1½
Do. ... ... Cum. pref.	5	75/—67/6	4	5⅞	69/-	
Do. ... ... Deb.	Stk.	80½—75	5	6⅝	77	
Beardmore (W.) ... ... Deb.	100	99—92	4⅜	5	91	
Brown (John) ... ... Ord.	1 (15s. pd.)	27/3—20/6	12½	8⅝	27/6	
Do. ... ... Cum. pref.	1	10—6⅜	5	5¼	8⅜	
Cammell Laird ... ... Ord.	5	7—98/-	10	8	6⅝	
Do. ... ... Cum. pref.	5	88/—76/3	5	6⅜	82/6	
Do. ... ... Deb.	100	93½—85	4½	5⅜	81	
Dunlop (Jas.) ... ... Ord.	1	19/7½-13/4½	10	10½	21/4½	+2/4½
Do. ... ... Cum. pref.	1	17/1⅜-16/4⅜	6	7⅛	17/6	
Fairfield Shipbldg. Cum. pref.	10	8½—8⅛	6	7⅜	8⅜	
Fleming & Ferguson ... Ord.	10	—	10	7	14½	
Gray (Wm.) ... ... Deb.	100	100¼—99½	4½	4½	100¼	
Hawthorn (R. & W.) Leslie Ord.	10	15½—14	12½	5⅜	23	
Henderson (D. & W.) Cum. pref.	1	—	5	9	1 1/16	
Richardsons Westgarth ... Ord.	1	7/9—2/10½	Nil.	Nil.	6/4½	
Do. ... ... Cum. pref.	1	15/7⅜—8/-	Nil.	Nil.	16/-	+ -/6
Do. ... ... Deb.	Stk.	69—67½	4½	6⅝	65	
Simons (W.) ... ... Cum. pref.	10	—	5	5	9½	
Swan, Hunter & W. R. ... Ord.	1	35/6—26/-	12½	6½	47/6	+1/6
Do. ... ... Cum. pref.	1	18/9—17/-	5	5½	17/-	
Do. ... ... Deb.	Stk.	82—80½	4½	5⅝	78	
Thornycroft (John I.) ... Ord.	1	38/9—21/9	17½	8½	39/6	— -/3
Do. ... ... Cum. pref.	1	18/6—16/3	6	6½	17/6	
Do. ... ... Deb.	100	95½—88	5	5⅝	85½	
Wallsend Slipway ... ... Ord.	1	2—1⅛	10	5	2	
Do. ... ... Cum. pref.	1	1—1	5	5	1	

* Including bonus. † Also 20 % in shares. ‡ Treasury price.

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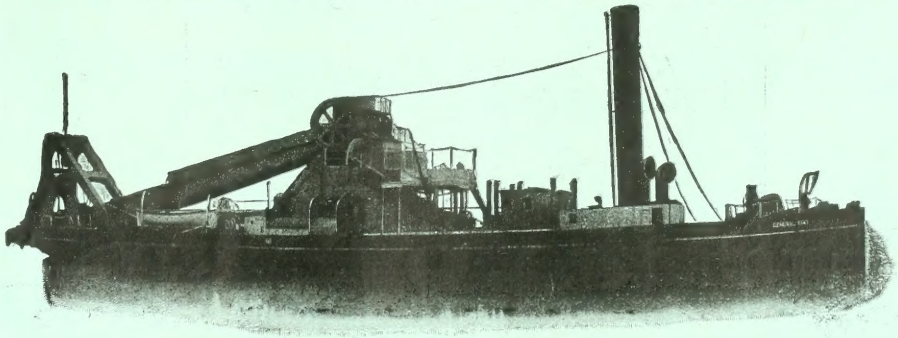

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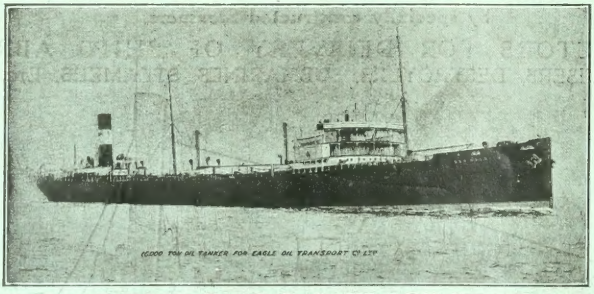

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SUNDERLAND

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